D03-128

DHS – SHELL BUILDING

12500 Tukwila International Boulevard

Due to the file size, this record has been broken down into 3 segments for easier download. Click on the following links to review the permit segments:

Segment 1	**-**	**DHS – Shell Building**	**D03-128**
Segment 2	**-**	**DHS – Shell Building**	**D03-128**
Segment 3	**-**	**DHS – Shell Building**	**D03-128**
Segment 4	**-**	**Plans - DHS – Shell Building**	**D03-128**

MAYES ***TESTING ENGINEERS, INC.***

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fax 503.281.7579

MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 109

RECEIVED
JAN 16 2004
COMMUNITY DEVELOPMENT

Date: **01/05/04**
Weather: Cloudy
Inspection: Lab, PT
Samples cast: None

Performed laboratory duties that include logging reports into the onsite computer database, removing molds from cylinders previously cast and re-introduced into cure tanks, and cleaning testing equipment for future use.

Set up Post Tensioning Stressing Records for Level P1 PT slab pour #3 between grids 2 and 7.5 from A to F. Stressing is scheduled for tomorrow, 1/6/04.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: **01/08/04**
Weather: Rain
Inspection: Lab, R/C
Samples cast: (8) 4x8"

Performed laboratory duties that include testing samples scheduled for testing and logging reports and test results into the onsite computer database.

Performed final inspection of rebar prior to placing concrete for Level P1 wall and pilasters on E.9/F from 7.5 to 11; ramp grade beams on E.9 and B from 11 to 13 and on 13 line from B to E.9; and Level P1 columns at grids E/8, E.9/8 and E/9. Contractor placed 73 cubic yards of Stoneway concrete mix #4356-a (4000 psi requirement) at walls and grade beams and mix #5950-a (5000 psi requirement) at columns. Concrete was placed by pump and consolidated mechanically. One sample of each mix classification was taken and four test cylinders were cast from each.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
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RECEIVED
JAN 12 2004
BUILDING
DEPARTMENT

Date: **12/31/03**
Weather: Cloudy, snow
Inspection: Lab, PT
Samples cast: (24) 4x8"

Performed laboratory duties that include testing samples scheduled to be tested and logging reports into the onsite computer database.

Monitored the placement of 573 cubic yards Stoneway concrete mix #5950-a (5000 psi requirement) for Level P-1 PT slab, pour #3, between grids 2 and 7.5 from A to F. Two pumps were used to place concrete, and concrete was monitored at each pump for mix design and slump requirements. Concrete was also monitored at the point of placement (deck). Four samples of concrete were taken and six test cylinders were cast from each (four lab cure and two field cure).

Prior to concrete placement, snow had fallen overnight and blankets were being removed from the deck that had been placed the day before. Snow that had fallen from the blankets onto the deck was melted with a weed burner and also blown with highly compressed air. During concrete placement, snow began to fall again and started to accumulate on portions of the deck where snow had previously been removed. A very little portion had concrete placed over a minimal amount of accumulated snow. The City of Tukwila building inspector was on site during the time that snow was falling and wanted the Sabey Project Superintendent to call the engineer of record to inform them that concrete placement was occurring during inclement weather (cold weather), and the request was refused. The City inspector called the engineer of record to inform them that the condition of placing concrete in cold weather needs to be addressed by the engineer, and that the contractor needs to follow the set guidelines. Please see **attached** engineer's letter of recommendations. Concrete placement continued without delay. By day's end, heaters were being run below the slab, and the contractor states that thermal blankets will be put on the slab tomorrow (1/1/04).

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride
Carl Reynolds, Mark Rossow

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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JAN 12 2004
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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 105

Date: **12/23/03**
Weather: Clear
Inspection: Lab, R/C
Samples cast: (9) 4x8"

Permit #: **D03-128**
Performed final clearance inspections prior to placing concrete for Level P-1 shear walls on 9-lione from C to D and on C and D lines from 9 to 9.4 and columns at grids B/8, B/9, B/10, C/8, C/10.2, D/10.2, E/10.2 and E/9. Monitored the placement of 52 cubic yards of Stoneway concrete mix #7550-a (10,000 psi requirement) placed at these locations by pump and mechanically consolidated. One sample of concrete was taken and five test cylinders were cast.

Performed final clearance inspections prior to placing concrete for Level P-1 shear walls and pilasters on 11-line from A to E and on A-line from 8 to 11. Monitored the placement of 81 cubic yards of Stoneway concrete mix #4356-a (4000 psi requirement) placed in these locations by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: **12/24/03**
Weather: Clear
Inspection: Lab
Samples cast: N/A

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled for testing, logging reports into the onsite computer database, retrieving test samples from the field that were cast on 12/23/03, and introducing samples into water bath cure tanks.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY:
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
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JAN 12 2004
BUILDING DEPARTMENT

Date: **12/29/03**
Weather: Clear
Inspection: Lab, PT
Samples cast: None

Performed laboratory duties that include testing samples scheduled for testing and logging reports into the onsite computer database.

Performed inspections of post tensioning tendons and reinforcing steel for Level P-1 PT slab, pour #3, between grids 2 and 7.5 from A to F. Tendons are in place and accounted for. Reinforcing steel is in progress of being installed. Rebar installed to date conforms to the approved plans and revisions. Tendon profiles still need to be completed. Final inspections of post tensioning tendons and reinforcing steel to take place tomorrow, 12/30/03.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: **12/30/03**
Weather: Cloudy
Inspection: Lab, PT
Samples cast: None

Performed laboratory duties that include testing samples scheduled for testing and logging reports into the onsite computer database.

Performed final inspections of post tensioning tendons and reinforcing steel for Level P-1 PT slab, pour #3, between grids 2 and 7.5 from A to F. After punch list and incomplete items were addressed and completed, all is per the approved structural and shop drawings and approved revisions. This deck is ready to receive concrete scheduled for placement tomorrow, 12/31/03.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 108

Date: **01/02/04**
Weather: Cloudy
Inspection: Lab
Samples cast: None

Performed laboratory duties that include logging reports into the onsite computer database, retrieving test samples from the field that were cast on December 31, and introducing samples into water bath cure tanks.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

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JAN 12 2004
BUILDING DEPARTMENT

REVIEWED BY _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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D03-128

ENW ENGINEERS NORTHWEST, INC., P.S.
STRUCTURAL ENGINEERS ~ 6869 WOODLAWN AVE. N. E., SEATTLE, WA 98115 (206) 525~7560 FAX (206) 522~6698

December 30, 2003

SABEY CORPORATION
12201 Tukwila Int'l Blvd
Seattle, WA 98168

ATTN: Rich Gardner

RE: Department of Homeland Security
Concrete Pour

Rich:

I understand you are pouring concrete today. You had snow on the deck first thing this morning and it is snowing while the pour continues.

The forms should be blown clear of the accumulated snow. It is my understanding this has taken place. During the pour the snow fall will cause more accumulation. If this amounts to a dusting, it should melt immediately when the concrete hits it. I am not concerned with this. More than ¼inch or so should be blown off just before the concrete is place.

Your plan for curing is to add heat under the slab. Screening of the openings below should help to concentrate the heat where it is needed. You also plan on using blankets on top of the slab. This should provide a good result.

If you have any questions please call.

Sincerely,

ENGINEERS NORTHWEST, INC., P.S.

Robert Ratchie, Jr., P.E.
President

RR:tn
ENW Project No. 02110000
Cc: Dave Larson – City of Tukwila

RECEIVED
DEC 31 2003
PERMIT CENTER
DEPARTMENT

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ENW ENGINEERS NORTHWEST, INC., P.S.
STRUCTURAL ENGINEERS – 6869 WOODLAWN AVE. N. E., SEATTLE, WA 98115 (206) 525-7560 FAX (206) 522-6698

December 30, 2003

SABEY CORPORATION
12201 Tukwila Int'l Blvd
Seattle, WA 98168

ATTN: Rich Gardner

RE: Department of Homeland Security
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Your plan for curing is to add heat under the slab. Screening of the openings below should help to concentrate the heat where it is needed. You also plan on using blankets on top of the slab. This should provide a good result.

If you have any questions please call.

Sincerely,

ENGINEERS NORTHWEST, INC., P.S.

Robert Raichle, Jr., P.E.
President

RR:tn
ENW Project No. 02110000
Cc: Dave Larson – City of Tukwila

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DEC 31 2003
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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 91

RECEIVED
DEC 12 2003
COMMUNITY DEVELOPMENT

Date: **12/01/03**
Weather: Cloudy
Inspection: Lab, R/S, epoxy, R/C
Samples cast: (4) 4x8"

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested this date and logging test results and reports into the onsite computer database.

Observed the installation of #4 stirrup hooks and #7 wall dowels into Level P-2 beam on A-line that needed replacement due to cutting bars for tendon stressing access. Holes were drilled for 5" and 8" embedment respectfully and cleaned by water flush and compressed air prior to installing dowels using Hilti HIT HY-150 adhesive.

Inspected rebar prior to closing forms for Level P-2 shear walls on C and D lines from 5.4 to 7 and on 6 and 7 lines from C to D. Rebar is found placed per shear wall elevations and details. Okay to close forms. A final clearance inspection is required prior to concrete placement.

Inspected rebar prior to placing concrete for the southwest exterior exhaust shaft slab. Rebar is found placed per lower slab reinforcing (Level P-3) in detail A-2.8. Contractor placed 8 cubic yards of Stoneway concrete mix #4356-a (3000 psi requirement) by truck chutes and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 92

Date: **12/02/03**
Weather: Cloudy
Inspection: Lab, R/C, R/S
Samples cast: (4) 4x8"

Permit #: **D03-128**
Performed laboratory duties that include retrieving test samples from the field cast on 12/01/03, introducing samples into water bath cure tanks, and logging test results and reports into the onsite computer database.

Inspected rebar prior to closing forms for Level P-2 shear walls and pilasters on E.9/F line from 7.5 to 3.8. Rebar is found placed per column and shear wall elevations and details. Okay to close forms. A final clearance inspection is required prior to placing concrete.

Inspected rebar for a final clearance inspection prior to placing concrete for the Level P-2 shear walls on C and D lines from 5.4 to 7 and on 6 and 7 lines from C to D, and Level P-2 columns at grids E/2.8, 4, 5, 6, 7; E.9/5; and B/6 and 7. Contractor placed 96 cubic yards of Stoneway concrete mix #6352-a (6000 psi requirement) by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 93

Date: **12/03/03**
Weather: Occasional showers
Inspection: Lab, R/C, R/S
Samples cast: (4) 4x8"

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested, retrieving test samples from the field cast on 12/2/03, introducing samples into water bath cure tanks and logging samples, test results and reports into the onsite computer database.

Inspected rebar prior to closing forms and placing concrete for Level P2 shear walls and pilasters on A line from 6.1 to 8.1 and on E.9/F line from 3.5 to 7.5. Rebar is found placed per column and shear wall elevations and details. Okay to close forms and place concrete. Contractor placed 74 cubic yards of Stoneway concrete mix #4356-a (4000 psi requirement) at the above-referenced locations by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 94

Date: **12/04/03**
Weather: Occasional showers
Inspection: Lab
Samples cast: None

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested, retrieving test samples from the field cast on 12/3/03, introducing samples into water bath cure tanks and logging samples, test results and reports into the onsite computer database.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: **12/05/03**
Weather: Rain
Inspection: Lab
Samples cast: None

Permit #: **D03-128**
Performed laboratory duties that include cleaning testing equipment for future use and logging reports into the onsite computer database.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 95

Date: **12/08/03**
Weather: Cloudy
Inspection: Lab, PT, rebar
Samples cast: None

Permit #: **D03-128**

Performed laboratory duties that include testing samples scheduled to be tested and logging test results and reports into the onsite computer database.

Performed preliminary inspections of post tensioning tendons and reinforcing steel for Level P1 PT slab, pour #4, between grids 7.5 and 11 from A to F. Bottom rebar, drag struts, wide shallow beam rebar, banded tendons and distributed tendons are in place and accounted for. Top rebar and perimeter rebar is in progress. A final inspection of reinforcing steel and tendon profiles is required prior to placing concrete.

Inspected rebar prior to closing forms for the southwest exterior shaft walls. Rebar is placed per plan details on S2.8 and the approved shop drawings. Okay to close forms. A final clearance inspection is required prior to placing concrete.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: **Mark A. Galusha, P.E.**

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MAYES ***TESTING ENGINEERS, INC.***

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Portland Office
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Portland, OR 97211
ph 503.281.7515
fax 503.281.7579

MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 96

Date: **12/09/03**
Weather: Cloudy
Inspection: Lab, PT, Rebar, R/C
Samples cast: (4) 4x8"

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested and logging test results and reports into the onsite computer database.

Performed preliminary inspections of post tensioning tendons and reinforcing steel for Level P1 PT slab, pour #4, between grids 7.5 and 11 from A to F. Outstanding and incomplete items from previous inspections are installed and completed by the end of the day. The engineer of record was also on site to perform observations. No concerns were noted, and slab is ready to receive concrete scheduled for placement tomorrow, 12/10/03.

Inspected rebar prior to closing forms for Level P2 shear walls and pilasters on 2-line from C.2 to E.9 and on A-line from 2 to 6.1 and the north core walls. Rebar is placed per the column schedule and shear wall elevations and details. Okay to close forms. Inside curtain dowels at the floor line will be installed after form closure for walls on 2 and A lines. A final rebar and clearance inspection is required prior to placing concrete.

Performed final clearance inspections of the southwest exterior exhaust shaft walls prior to concrete placement. Clearances were found acceptable. Contractor placed 15 cubic yards Stoneway concrete mix #4356-a (4000 psi requirement) by crane and bucket and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY:
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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CITY OF TUKWILA

MAYES ***TESTING ENGINEERS, INC.***

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 97

Date: **12/10/03**
Weather: Cloudy
Inspection: Lab, PT
Samples cast: (18) 4x8"

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested today and logging test results and reports into the onsite computer database.

Monitored the placement of concrete for Level P-1 PT slab, pour #4, between grids A and F from 7.5 to 11. Concrete was monitored both at the point of discharge (pump) for slump and mix design verification and at the point of placement (deck) for correction of displaced items. A total of 370 cubic yards of Stoneway mix #5950-a (5000 psi required) was placed at the above-referenced location by pump and consolidated mechanically. Three samples of concrete were taken and six test cylinders were cast from each sample – 4 lab cured and 2 field cured. A thermocouple system was provided by MTE and used for field-cured specimens. Please note that due to mechanical difficulties, there was a lengthy delay in concrete placement, resulting in a possible cold joint on E.8 line from 7.5 to 9.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride,
Michael Craig

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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EXHIBIT

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Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 98

Date: **12/11/03**
Weather: Cloudy
Inspection: Lab, R/C
Samples cast: (8) 4x8"

Permit #: **D03-128**

Performed laboratory duties that include testing samples scheduled to be tested, logging test results and reports into the onsite computer database, retrieving samples from the field that were cast on 12/10/03, and introducing samples into water bath cure tanks.

Performed final clearance inspections prior to concrete placement for Level P-2 shearwalls on C and D lines from 3.6 to 4.5 and on 4-line from C to D, and Level P-2 columns at grids B/3, 4, 5; C/2.8; and D/2.8. Contractor placed 61 cubic yards of Stoneway concrete mix #6352-a (6000 psi required) by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

Performed final rebar and clearance inspections prior to placing concrete for Level P-2 shear walls and pilasters on E.9-line from 2 to 3.5, 2-line from C.2 to E.9, and on A-line from 2 to 6.1. Contractor placed 93 cubic yards of Stoneway concrete mix #4356-1 (4000 psi required) by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: **Mark A. Galusha, P.E.**
for

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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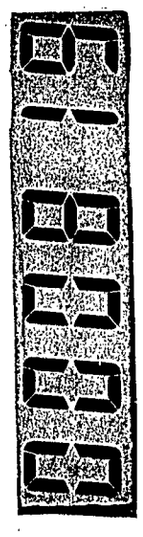

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Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 99

Date: **12/12/03**
Weather: Cloudy
Inspection: Lab, PT
Samples cast: None"

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested, logging test results and reports into the onsite computer database, retrieving samples from the field that were cast on 12/11/03, and introducing samples into water bath cure tanks.

Set up Post-Tensioning Stressing Records for Level P-1 PT slab, pour #4, between grids 7.5 and 11 from A to F. Stressing is scheduled for Monday, 12/15/03.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.
For

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 100

Date: **12/15/03**
Weather: Cloudy
Inspection: Lab, PT
Samples cast: None"

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested, logging test results and reports into the onsite computer database, and retrieving field cured samples from the field that were cast on 12/10/03.

Stressing of the Level P1 PT slab, pour #4, between grids 7.5 and 11 from A to F was cancelled due to lack of access to the distributed tendons at the west side of the building. Rich Gardner with Sabey requested testing of one field cured cylinder from east set. Strengths are 2840 psi, 2980 psi and 2840 psi. Concrete strength also not satisfactory for stressing.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.
for

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 101

Date: **12/16/03**
Weather: Clouds, rain
Inspection: Lab, PT
Samples cast: None"

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested, logging test results and reports into the onsite computer database, and retrieving field cured samples from the field that were cast on 12/10/03.

Tested field cured cylinders prior to stressing tendons for Level P1 PT slab, pour #4, between grids 7.5 and 11 from A to F. Strengths are 3260 psi, 3290 psi and 3040 psi. Monitored the stressing of tendons at this location. Verified the use of calibrated equipment and tendons stressed to specified gauge pressure. Actual tendon elongations were measured and recorded on a Post Tensioning Stressing Record **(attached).** At the completion of stressing, the stressing records were compiled and given to Rich Gardner with Sabey to forward to the engineer of record for his review prior to cutting tendon tails.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: for **Mark A. Galusha, P.E.**

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Post-Tensioning Stressing Record

Project: DHS Headquarters
Project Location: Tukwila, WA
Pour ID: Level P-1, pour #4

General Contractor: Sabey Const.
Date: 16 DEC 2003
Inspector: M. McBride

Equipment Set #1
Ram # 772
Gauge # 1028
Calibration Date: 11-16-03

Equipment Set #2
Ram #
Gauge #
Calibration Date:

Equipment Set #3
Ram #
Gauge #
Calibration Date:

Gauge Pressure: 6900 Specified Concrete Strength: 3000 Age of Breaks: 6 days Strengths: 3260 3290 3040

Page 1 of 9

						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
1		148'	11 1/2"	11 5/8	3/4"	23 5/8	12"	11 5/8	12	12"	0	Distributed tendons
2				11 3/8		23 1/2		11 1/2	11 7/8		-1/8	North to South
3				11 1/4		23 1/2		11 1/2	11 3/4		-1/4	
4				11 5/8		23 7/8		11 7/8	11 3/4		-1/4	
5				11 1/2		23 3/4		11 3/4	11 3/4		-1/4	
6				11 3/8		23 3/4		11 3/4	11 5/8		-3/8	
7				11 3/4		24		12	11 3/4		-1/4	
8				11 3/4		24		12	11 3/4		-1/4	
9				11 1/2		23 5/8		11 5/8	11 7/8		-1/8	
10				11 1/4		23 3/8		11 3/8	11 7/8		-1/8	
11				11 1/8		23 1/4		11 1/4	11 7/8		-1/8	
12				11 3/8		23 1/2		11 1/2	11 7/8		-1/8	
13				11 5/8		23 3/4		11 3/4	11 7/8		-1/8	
14				11 5/8		23 3/4		11 3/4	11 7/8		-1/8	
15				11 1/2		23 5/8		11 5/8	11 7/8		-1/8	

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
16		148'	11 1/2"	11 3/8	3/4"	23 1/2	12"	11 1/2	11 7/8	12"	-1/8	Cont. dist. N-S
17				11 5/8		23 3/4		11 3/4	11 7/8		-1/8	
18				11 1/2		23 1/2		11 1/2	12		0	
19				11 1/4		23 1/4		11 1/4	12		0	
20				11 3/8		23 1/2		11 1/2	11 7/8		-1/8	
21				11 5/8		23 3/4		11 3/4	11 7/8		-1/8	
22				11 1/2		23 1/2		11 1/2	12		0	
23				11 3/4		23 7/8		11 7/8	11 7/8		-1/8	
24				11 5/8		23 7/8		11 7/8	11 3/4		-1/4	
25				11 5/8		23 3/4		11 3/4	11 7/8		-1/8	
26				11 1/2		24		12	11 1/2		-1/2	
27				11 3/8		23 3/4		11 3/4	11 5/8		-3/8	
28				11 3/8		23 7/8		11 7/8	11 1/2		-1/2	
29				11 3/4		24 1/4		12 1/4	11 1/2		-1/2	
30				11 1/4		23 1/4		11 1/4	12		0	
31				11 1/2		23 5/8		11 5/8	11 7/8		-1/8	
32				11 1/2		23 3/4		11 3/4	11 3/4		-1/4	
33				11 1/2		23 1/2		11 1/2	12		0	
34				11 3/4		23 3/4		11 3/4	12		0	
35				11 1/2		23 1/2		11 1/2	12		0	
36				11 1/2		23 3/4		11 3/4	11 3/4		-1/4	
37		↓	↓	11 5/8	↓	23 3/4		11 3/4	11 7/8	↓	-1/8	↓
38		68'	5 1/4	5 3/8	3/8"	17 3/8		5 3/8				Dist. from stair opening
39		↓	↓	5 1/4	↓	17 1/4		5 1/4				to E.9 line.
40		↓	↓	5 3/8	↓	17 3/8	↓	5 3/8				↓

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
41		68'	5'1/4"	5 3/8	3/8"	17 3/8	12"					Cont. dist. from stair
42		↓	↓	5 3/8	↓	17 3/8						opening to E. 9 line.
43		143'	11'1/8"	10 1/2	3/4"	22'1/8		10'1/8	12 3/8	12"	3/8	Continue Dist from
44				11 1/8		23 3/8		11 3/8	11 3/4		-1/4	N - 5
45				11 1/4		23 3/8		11 3/8	11 7/8		-1/8	
46				11 1/4		23 1/4		11 1/4	12		0	
47				11 3/8		23 1/2		11 1/2	11 7/8		-1/8	
48				11 3/8		23 1/2		11 1/2	11 7/8		-1/8	
49				10 3/4		23 1/4		11 1/4	11 1/2		-1/2	
50				11 7/8		22 3/4		11 3/4	12 1/8		1/8	
51				11		23 1/4		11 1/4	11 3/4		-1/4	
52				11		23 1/8		11 1/8	11 7/8		-1/8	
53				11		23 1/4		11 1/4	11 3/4		-1/4	
54				11		23 1/8		11 1/8	11 7/8		-1/8	
55				11 1/4		23 1/2		11 1/2	11 3/4		-1/4	
56				11 1/4		23 1/2		11 1/2	11 3/4		-1/4	
57				11 1/2		23 3/4		11 3/4	11 3/4		-1/4	
58				10 3/4		22 1/2		10 1/2	12 1/4		1/4	
59				11 1/8		23 1/8		11 1/8	12		0	
60				11		23 1/4		11 1/4	11 3/4		-1/4	
61				11 1/8		23 1/4		11 1/4	11 7/8		-1/8	
62				10 3/4		22 3/4		10 3/4	12		0	
63				10 3/8		22 1/2		10 1/2	11 7/8		-1/8	
64				11		23 1/4		11 1/4	11 3/4		-1/4	
65		↓	↓	11	↓	193/4	↓	73/4	15 1/4	↓	3 1/4	↓

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
66		143'	11'8"	10'1/4	3/4"	21 3/4	12"	9 3/4	12'1/2	12"	1/2	Cont. Dist. from N-S
67				10'1/2		22'1/4		10'1/4	12'1/4		1/4	
68				11'1/4		23'1/4		11'1/4	12		0	
69				10'7/8		23		11	11'7/8		-1/8	
70				11		23		11	12		0	
71				11'1/2		23 5/8		11 5/8	11'7/8		-1/8	
72				11		23		11	12		0	
73				11'1/8		23'1/8		11'1/8	12		0	
74				11		23'1/4		11'1/4	11 3/4		-1/4	
75				11'1/8		23'1/8		11'1/8	12		0	
76				11 3/8		23 1/2		11 1/2	11'7/8		-1/8	
77				11'1/4		23'1/4		11'1/4	12		0	
78				11'1/8		23 3/8		11 3/8	11 3/4		-1/4	
79				11'1/2		23 5/8		11 5/8	11'7/8		-1/8	
80				11'1/8		23'1/8		11'1/8	12		0	
81				11 5/8		23 5/8		11 5/8	12		0	
82		64'	5"	45/8	3/8"	16 5/8						Dist. from Stair opening
83				45/8		16 5/8						to A line
84				43/4		16 3/4						
85				43/4		16 3/4						
86				43/4		16 3/4						
87		107'	8 3/8"	7'1/2	5/8"	19'1/2						Banded on A line.
88				75/8		19 5/8						
89				75/8		19 5/8						
90				75/8		19 5/8						

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Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
91		107'	8 3/8"	75/8	5/8"	195/8	12"					Cont. Banded on A line
92				75/8		195/8						
93				75/8		195/8						
94				7 1/2		191/2						
95				73/4		193/4						
96				7 1/2		191/2						
97		107'	8 3/8"	7 1/2	5/8"	191/2						Banded on B line
98				7 1/2		191/2						
99				7 1/2		191/2						
100				7 1/2		191/2						
101				7 1/2		191/2						
102				75/8		195/8						
103				75/8		195/8						
104				7 1/2		191/2						
105				7 1/2		191/2						
106				7 1/2		191/2						
107				75/8		195/8						
108				7 1/2		191/2						
109				73/4		193/4						
110				7 1/2		191/2						
111				75/8		195/8						
112				7 1/2		191/2						
113				73/4		193/4						
114				7 1/2		191/2						
115				7 1/2		191/2						

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PUBLIC RECORD

Page 6 of 9

						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
116		107'	8 3/8"	7 3/4	5/8"	19 3/4	12"					Cont. Banded on B line
117		↓	↓	7 3/4	↓	19 3/4						
118		55'	4 1/4"	4	1/4"	16						ADDEDS
119		↓	↓	4	↓	16						
120		↓	↓	4	↓	16						
121		44'	3 3/8"	3 3/8	1/4"	15 3/8						
122		↓	↓	3 1/4	↓	15 1/4						
123		↓	↓	3 1/4	↓	15 1/4						
124		107'	8 3/8"	7 1/2	5/8"	19 1/2						Banded on C line
125				7 1/2		19 1/2						
126				7 1/2		19 1/2						
127				7 1/2		19 1/2						
128				7 5/8		19 5/8						
129				7 3/8		19 3/8						
130				7 3/8		19 3/8						
131				7 1/2		19 1/2						
132				7 1/2		19 1/2						
133				7 3/8		19 3/8						
134				7 3/8		19 3/8						
135				7 3/8		19 3/8						
136				7 3/4		19 3/4						
137				7 1/2		19 1/2						
138				7 1/2		19 1/2						
139				7 3/8		19 3/8						
140		↓	↓	7 1/2	↓	19 1/2	↓					

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
141		107'	8 3/8"	7 1/2	5/8"	19 1/2	12"					Cont. Banded on C line
142				7 5/8		19 5/8						
143				7 1/2		19 1/2						
144				7 1/2		19 1/2						
145		65'	5"	4 3/4	3/8"	16 3/4						ADDEDS
146				4 7/8		16 7/8						
147				4 7/8		16 7/8						
148		107'	8 3/8"	7 3/8	5/8"	19 3/8						Banded on D line
149				7 1/2		19 1/2						
150				7 1/2		19 1/2						
151				7 1/4		19 1/4						
152				7 1/2		19 1/2						
153				7 3/8		19 3/8						
154				7 3/8		19 3/8						
155				7 1/4		19 1/4						
156				7 1/2		19 1/2						
157				7 1/2		19 1/2						
158				7 1/4		19 1/4						
159				7 1/2		19 1/2						
160				7 1/2		19 1/2						
161				7 3/8		19 3/8						
162				7 1/2		19 1/2						
163				7 1/2		19 1/2						
164				7 1/2		19 1/2						
165				7 1/2		19 1/2						

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
166		107'	8 3/8"	7 1/2	5/8"	19 1/2	12"					Cont. Banded on D line
167		↓	↓	7 1/2	↓	19 1/2	↓					
168		↓	↓	7 1/2	↓	19 1/2	↓					
169		6.5'	5"	4 7/8	3/8"	16 7/8	↓					ADDED 5
170		↓	↓	4 7/8	↓	16 7/8	↓					↓
171		↓	↓	5	↓	17	↓					↓
172		107'	8 3/8"	7 1/2	5/8"	19 1/2	↓					Banded on E line
173		↓	↓	7 1/2	↓	19 1/2	↓					↓
174		↓	↓	7 1/2	↓	19 1/2	↓					↓
175		↓	↓	7 5/8	↓	19 5/8	↓					↓
176		↓	↓	7 1/2	↓	19 1/2	↓					↓
177		↓	↓	7 5/8	↓	19 5/8	↓					↓
178		↓	↓	7 5/8	↓	19 5/8	↓					↓
179		↓	↓	7 1/2	↓	19 1/2	↓					↓
180		↓	↓	7 3/8	↓	19 3/8	↓					↓
181		↓	↓	7 1/2	↓	19 1/2	↓					↓
182		↓	↓	7 1/2	↓	19 1/2	↓					↓
183		↓	↓	7 1/2	↓	19 1/2	↓					↓
184		↓	↓	7 5/8	↓	19 5/8	↓					↓
185		↓	↓	7 1/2	↓	19 1/2	↓					↓
186		↓	↓	7 3/4	↓	19 3/4	↓					↓
187		↓	↓	7 1/2	↓	19 1/2	↓					↓
188		↓	↓	7 1/2	↓	19 1/2	↓					↓
189		↓	↓	7 3/8	↓	19 3/8	↓					↓
190		↓	↓	7 3/8	↓	19 3/8	↓					↓

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
191		107'	8 3/8"	7 1/2	5/8"	19 1/2	12"					Cont. Banded on E line.
192		↓	↓	7 1/2	↓	19 1/2						
193		55'	4 1/4"	4	1/4"	16						ADDEDS
194		↓	↓	4 1/8	↓	16 1/8						
195		↓	↓	4	↓	16						
196		107'	8 3/8"	7 1/2	5/8"	19 1/2						Banded on E.9 line
197				7 5/8		19 5/8						
198				7 1/2		19 1/2						
199				7 1/2		19 1/2						
200				7 1/2		19 1/2						
201				7 5/8		19 5/8						
202				7 1/2		19 1/2						
203				7 3/8		19 3/8						
204				7 1/2		19 1/2						
205		↓	↓	7 1/2	↓	19 1/2	↓					↓

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fax 503.281.7579

MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 102

Date: **12/17/03**
Weather: Mostly clear
Inspection: Lab, R/C, R/S
Samples cast: (4) 4x8"

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested and logging test results and reports into the onsite computer database.

Performed final inspection of re-steel prior to concrete placement for Level P2 shearwall and pilasters on 2-line from A to C.2, and the northwest exhaust shaft walls from Level P2 to P1. Contractor placed 45 cubic yards of Stoneway concrete mix #4356-a (4000 psi requirement) by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

Inspected re-steel prior to form closure for Level P1 shearwalls on C and D lines from 9 to 9.4 and on 9-line from C to D. Re-steel is placed per shearwall elevations and detail call-outs on S5.2, S5.4 and S5.5. Okay to close forms. A final clearance inspection is required prior to concrete placement.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
For **Mark A. Galusha, P.E.**

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 103

Date: **12/18/03**
Weather: Clear
Inspection: Lab, R/S
Samples cast: None

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested, logging test results and reports into the onsite computer database, retrieving test samples from the field that were cast on 12/17/03, and introducing samples into water bath cure tanks.

Inspected rebar prior to closing forms for Level P1 shearwall and pilasters on 11-line from A to F. Rebar is placed per shearwall elevations and detail call-outs on S5.1 and column schedule on S4.1. Okay to close forms. A final clearance inspection is required prior to placing concrete.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.
For

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Portland Office
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ph 503.281.7515
fax 503.281.7579

MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 104

Date: **12/19/03**
Weather: Clear
Inspection: Lab, R/S
Samples cast: None

Permit #: **D03-128**
Performed laboratory duties that include cleaning testing equipment for future use at site, transporting equipment to MTE's main laboratory for calibration, and logging reports into the onsite computer database.

Inspected rebar prior to closing forms for Level P1 shearwall and pilasters on A-line from 7.5 to 11. Rebar is placed per shearwall elevations and detail call-outs on S5.3 and column schedule on S4.1. Okay to close forms. A final clearance inspection is required prior to placing concrete.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: **12/22/03**
Weather: Clear
Inspection: Lab, R/S
Samples cast: None

Permit #: **D03-128**
Performed laboratory duties that include cleaning testing equipment for future use at site and logging reports into the onsite computer database.

Inspected rebar prior to closing forms for Level P1 shearwall and pilasters on E.9/F line from 7.5 to 11. Rebar is placed per shearwall elevations and detail call-outs on S5.5 and 5.6 and column schedule on S4.1. Okay to close forms. A final clearance inspection is required prior to placing concrete.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.
for

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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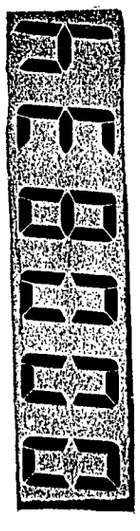

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COMMUNITY DEVELOPMENT

MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 77

Date: **11/07/03**
Weather: Clear
Inspection: Lab, PT

Permit #: **D03-128**
Performed laboratory duties, which include testing samples scheduled to be tested and logging test results and reports into the onsite computer database.

Set up post tensioning stressing records for Level P-2 PT slab, pour #2, between grids 7.5 and 11 from A to F in preparation for stressing scheduled for Monday, 11/10/03.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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EXHIBIT 53

MAYES ***TESTING ENGINEERS, INC.***

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fax 503.281.7579

MTE No.: E3187
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 78

Date: **11/10/03**
Weather: Cloudy
Inspection: Lab, PT, R/C

Permit #: **D03-128**
Performed lab duties that include retrieving field cured cylinders from the field cast on 11/5/03, testing samples scheduled to be tested, and logging test results and reports into the onsite computer database.

Monitored the stressing of post tensioning tendons for Level P2 PT slab pour #2 between grids 7.5 and 11 from A to F. Gauge pressure was verified according to calibration records provided by Central Steel. Actual tendon elongations were measured and recorded on post tensioning stressing record. By the end of the day, only the distributed tendons had been stressed, leaving the banded tendons for stressing continuation tomorrow, 11/11/03. Stressing was delayed due to electrical and access challenges.

Inspected rebar for a final clearance inspection prior to placing concrete for Level P2 columns at grids 8/B, C. D, E and E.9; 9/E, 10.2/E; and 10.2/D. Contractor placed 11 cubic yards of Stoneway concrete mix #5950-a (5000 psi required) at above referenced column locations by crane and bucket and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride, Mark Rossow

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Post-Tensioning Stressing Record

Project: Department of Homeland Security
Project Location: Tukwila, WA
Pour ID: Level P-2, Pour # 2.

General Contractor: Sabey Const.
Date: 11-10-03, 11-11-03
Inspector: M. McBride

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By

Equipment Set #1
Ram # 771
Gauge # 1028
Calibration Date: 11-6-03

Equipment Set #2
Ram #
Gauge #
Calibration Date:

Equipment Set #3
Ram #
Gauge #
Calibration Date:

Gauge Pressure: 6900 Specified Concrete Strength: 3000psi Age of Breaks: 5 days Strengths: 3720 psi 4561psi 3922psi

*- Denotes tendons stressed at one end due to top beam steel interference at A line.

**- Denotes elongations adjusted in field by deducting exhaust shaft dimensions from overall tendon lengths shown on shop drawings.

Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	First End Gross Δ	First End Mark Δ	First End Net Δ	Second End Gross Δ	Second End Mark Δ	Second End Net Δ	Comments
*1		148'	11 1/2"	10 7/8	3/4"	23 1/8	12"	11 1/8	11 3/4	12"	-1/4	Distributed from 7.5 to 11
*2		〃	〃	10 3/4	〃	23 1/8	〃	11 1/8	11 5/8	〃	-3/8	〃
*3		〃	〃	11	〃	23 1/4	〃	11 1/4	11 3/4	〃	-1/4	〃
*4		〃	〃	10 3/4	〃	23	〃	11	11 3/4	〃	-1/4	〃
*5		〃	〃	10 1/4	〃	22 3/4	〃	10 3/4	11 1/2	〃	-1/2	〃
*6		〃	〃	10 3/4	〃	23 1/4	〃	11 1/4	11 1/2	〃	-1/2	〃
*7		〃	〃	10 1/4	〃	23	〃	11	11 1/4	〃	-3/4	〃
*8		〃	〃	10 1/2	〃	23	〃	11	11 1/2	〃	-1/2	〃
*9		〃	〃	10 3/4	〃	23	〃	11	11 3/4	〃	-1/4	〃
*10		〃	〃	10 3/4	〃	23	〃	11	11 3/4	〃	-1/4	〃
*11		〃	〃	10 1/2	〃	22 3/4	〃	10 3/4	11 3/4	〃	-1/4	〃
*12		〃	〃	10 1/2	〃	23	〃	11	11 1/2	〃	-1/2	〃
*13		〃	〃	11	〃	23 1/4	〃	11 1/4	11 3/4	〃	-1/4	〃
14		〃	〃	10 3/4	〃	22 3/4	〃	10 3/4	12	〃	0	〃
15		〃	〃	10 7/8	〃	22 7/8	〃	10 7/8	12	〃	0	〃

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
16		148'	11 1/2"	10 3/4	3/4"	22 3/4	12"	10 3/4	12	12"	0	Distributed from 7.5 to 11
17				10 3/4		22 5/8		10 5/8	12 1/8		1/8	
18				11 1/4		23 3/4		11 3/4	11 1/2		-1/2	
19				11 1/2		23 3/4		11 3/4	11 3/4		-1/4	
20				11 1/4		23 1/2		11 1/2	11 3/4		-1/4	
21				11 3/8		21 5/8	10"	11 5/8	11 3/4		-1/4	
22				11		23 1/4	12"	11 1/4	11 3/4		-1/4	
23				11 1/4		23 1/4		11 1/4	12		0	
24				11 1/4		23 1/4		11 1/4	12		0	
25				11		23		11	12		0	
26				11 1/4		23 1/2		11 1/2	11 3/4		-1/4	
27				10 3/4		23		11	11 3/4		-1/4	
28				11 1/4		23 1/2		11 1/2	11 3/4		-1/4	
29				11 3/8		23 1/2		11 1/2	11 7/8		-1/8	
30				11 3/8		23 3/4		11 3/4	11 5/8		-3/8	
31				11 3/8		23 1/2		11 1/2	11 7/8		-1/8	
32				11 1/4		23 1/4		11 1/4	12		0	
33				11 1/8		23 1/4		11 1/4	11 7/8		-1/8	
34				11 1/8		23 1/2		11 1/2	11 5/8		-3/8	
35				11 1/8		23 3/8		11 3/8	11 3/4		-1/4	
36				10 7/8		23 1/8		11 1/8	11 3/4		-1/4	
37				11 1/4		23 1/2		11 1/2	11 3/4		-1/4	
38		68'	5 1/4	5	3/8"	17		5				(Dist. Dead end at stair stressed @ C.G. line
39				5		17		5				
40				5		17		5				

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
41		68'	5 1/4	5	3/8"	17	12"	5				Dist. Dead ended at stair Stressed at E.4 line
42		↓	↓	5	↓	17	↓	5				↓ ↓
43		143'	11 1/8"	11 1/4	3/4"	23 1/4		11 1/4	12	12"	0	Distributed 7.5 to 11.
44				11		23		11	12		0	
45				10 3/4		22 3/4		10 3/4	12		0	
46				11 1/4		23 1/4		11 1/4	12		0	
47				10 5/8		22 3/4		10 3/4	11 7/8		-1/8	
48				10 7/8		23 1/8		11 1/8	11 3/4		-1/4	
49				10 7/8		22 5/8		10 5/8	12 1/4		1/4	
50				10 5/8		23		11	11 5/8		-3/8	
51				10 3/4		22		10	12 3/4		3/4	
52				10 3/8		22		10	12 3/8		3/8	
53				10 1/2		21 3/4		9 3/4	12 3/4		3/4	
54				10 1/2		21 1/2		9 1/2	13		1	
55				10 3/8		22		10	12 3/8		3/8	
56				10 3/4		22		10	12 3/4		3/4	
57				10 1/2		22		10	12 1/2		1/2	
58				10 1/2		22 1/4		10 1/4	12 1/4		1/4	
59				10 1/2		22 1/4		10 1/4	12 1/4		1/4	
60				10 1/2		22 1/2		10 1/2	12		0	
61				10 1/2		22 1/4		10 1/4	12 1/4		1/4	
62				10 1/2		22 3/8		10 3/8	12 1/8		1/8	
63				10 3/4		22 1/4		10 1/4	12 1/2		1/2	
64				10 3/4		22 1/4	↓	10 1/4	12 1/2		1/2	
65		↓	↓	10 7/8	↓	21 3/8	11 1/4	10 1/8	12 3/4	↓	3/4	↓

Mayes 607 Rev 4-98

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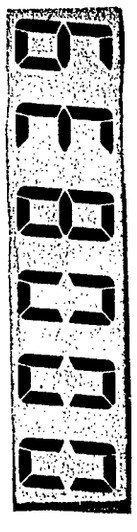

	Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	First End Gross Δ	First End Mark Δ	First End Net Δ	Second End Gross Δ	Second End Mark Δ	Second End Net Δ	Comments
	66		143'	11 1/8"	10 3/8	3/4"	22	12"	10	12 3/8	12"	3/8	Distributed 7.5 to 11
	67				10 3/8		21 3/8		9 3/8	13		1	
	68				10 3/8		21 7/8		9 7/8	12 1/2		1/2	
	69				10 3/8		21 1/2		9 1/2	12 7/8		7/8	
	70				10 5/8		22 1/4		10 1/4	12 3/8		3/8	
	71				10 3/4		22		10	12 3/4		3/4	
	72				11 1/8		23 1/2		11 1/2	11 5/8		-3/8	
	73				10 3/4		22 3/4		10 3/4	12		0	
	74				11 1/4		23 1/4		11 1/4	12		0	
	75				10 3/4		23 1/4		11 1/4	11 1/2		-1/2	
	76				10 7/8		23		11	11 7/8		-1/8	
	77				10 5/8		22 1/2		10 1/2	12 1/8		1/8	
	78				10 3/4		21 1/2		9 1/2	13 1/4		1 1/4	
	79				10 1/2		21		9	13 1/2		1 1/2	
*	80		130'	10 1/2"	9 1/2	3/4"	20 1/2		~~10~~ 9 1/2	13		1	
*	81				9 1/2		20 1/2		8 1/2	13		1	
*	82				10		21 1/2		9 1/2	12 1/2		1/2	
*	83				9 3/4		21		9	12 3/4		3/4	
	84		64'	5"	4 1/2	3/8"	16 1/2		4 1/2				Dist. Dead end at stair stressed at A line
	85				4 1/2		16 1/2		4 1/2				
	86				4 1/2		16 1/2		4 1/2				
	87				4 1/2		16 1/2		4 1/2				
	88				4 1/2		16 1/2		4 1/2				

Mayes 007 Nov-88

MAYES TESTING ENGINEERS

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Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	First End Gross Δ	First End Mark Δ	First End Net Δ	Second End Gross Δ	Second End Mark Δ	Second End Net Δ	Comments
89		107'	83 3/8"	77 1/8	5/8"	197 1/8	12"					Banded at A line.
90				77 1/8		197 1/8						
91				77 1/8		197 1/8						
92				73 1/4		193 1/4						
93				77 1/8		197 1/8						
94				8		20						
95				8		20						
96				77 1/8		197 1/8						
97				77 1/8		197 1/8						
98				77 1/8		197 1/8						
99		107'	83 3/8"	77 1/8	5/8"	197 1/8						Banded at B line
100				75 1/8		195 1/8						
101				71/2		191/2						
102				8		20						
103				73 1/4		193 1/4						
104				73 1/4		193 1/4						
105				8		20						
106				8		20						
107				77 1/8		197 1/8						
108				73 1/4		193 1/4						
109				8		20						
110				73 1/4		193 1/4						
111				75 1/8		195 1/8						
112				73 1/4		193 1/4						
113				77 1/8		197 1/8						

Mayes 007 Rev 4-93

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
114		107'	8 3/8"	8	5/8"	20	12"					Cont. Banded at B line
115				8 1/8		20 1/8						
116				8 1/8		20 1/8						
117				8 1/8		20 1/8						
118				8 1/8		20 1/8						
119				8		20						
120		55'	4 1/4"	4	1/4"	16						ADDED Stressed @ 7.5
121				4 1/8		16 1/8						ADDED
122				4 1/4		16 1/4						ADDED
123		44'	3 3/8"	3 1/8	1/4"	15 1/8						ADDED Stressed @ 11
124				3 1/8		15 1/8						ADDED
125				3		15						ADDED
126		107'	8 3/8"	7 3/4	5/8"	19 3/4						Banded at C line
127				8		20						
128				8		20						
129				8		20						
130				7 3/4		19 3/4						
131				7 3/4		19 3/4						
132				7 1/2		19 1/2						
133				7 3/4		19 3/4						
134				7 5/8		19 5/8						
135				7 3/4		19 3/4						
136				7 5/8		19 5/8						
137				7 3/4		19 3/4						
138				7 3/4		19 3/4						

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
139		107'	83 3/8"	75 1/8	5/8"	195 1/8	12"					Cont. Banded at C line.
140				73 1/4		193 1/4						
141				73 1/4		193 1/4						
142				8		20						
143				77 1/8		197 1/8						
144				73 1/4		193 1/4						
145				8		20						
146				73 1/4		193 1/4						
147		65'	5"	47 1/8	3/8"	167 1/8						ADDED
148				5		17						ADDED
149				43 1/4		163 1/4						ADDED
150		107'	83 3/8"	73 1/4	5/8"	193 1/4						Banded at D line
151				73 1/4		193 1/4						
152				73 1/4		193 1/4						
153				75 1/8		195 1/8						
154				8		20						
155				8		20						
156				77 1/8		197 1/8						
157				71/2		191/2						
158				75 1/8		195 1/8						
159				73 1/4		193 1/4						
160				73 1/4		193 1/4						
161				71/2		191/2						
162				75 1/8		195 1/8						
163				77 1/8		197 1/8						

Mayes 007 Rev 6-81

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EXHIBIT 5

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
164		107'	8 3/8"	7 7/8	5/8"	19 7/8	12"					Cont. Banded at D line
165				8		20						
166				8		20						
167				8		20						
168				8		20						
169				7 7/8		19 7/8						
170				8 1/8		20 1/8						
171		65'	5"	5	3/8"	17						ADDED
172				5		17						ADDED
173				4 3/4		16 3/4						ADDED
174		107'	8 3/8"	7 1/2	5/8"	19 1/2						Banded at E line
175				7 1/2		19 1/2						
176				7 5/8		19 5/8						
177				7 1/2		19 1/2						
178				7 5/8		19 5/8						
179				7 1/2		19 1/2						
180				7 1/2		19 1/2						
181				7 1/2		19 1/2						
182				7 3/4		19 3/4						
183				7 1/2		19 1/2						
184				7 5/8		19 5/8						
185				7 1/2		19 1/2						
186				7 1/2		19 1/2						
187				7 5/8		19 5/8						
188				7 1/2		19 1/2						

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
189		107'	8 3/8"	7 1/2	5/8"	191/2	12"					cont. Banded on E line
190				7 1/2		191/2						
191				7 5/8		195/8						
192				7 1/2		191/2						
193				7 5/8		195/8						
194				7 3/4		193/4						
195		55'	4'1/4"	4'1/8	1/4"	16'1/8						ADDED
196				4		16						ADDED
197				4		16						ADDED
* 198		101'	8'1/8"	7'1/2	1/2"	19'1/2						Banded at E.9 line.
* 199				7 1/2		191/2						
* 200				7 3/4		193/4						
* 201				7 7/8		197/8						
* 202				7 3/4		193/4						
* 203				7 3/4		193/4						
* 204				7 5/8		195/8						
* 205				7 5/8		195/8						
* 206				7 1/2		191/2						
* 207				7 1/2		19'1/2						

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MTE No.: E3187
Project: DHS REGIONAL HEADQUARTERS
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: D03-128 / D03-129 (City of Tukwila)

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 79

Date: 11/11/03
Weather: Cloudy
Inspection: Lab, PT, R/S

Permit #: D03-128
Performed lab duties that include retrieving field cured cylinders from the field cast on 11/5/03, testing samples scheduled to be tested, logging test results and reports into the onsite computer database, and introducing samples into water bath cure tanks.

Monitored the stressing of post tensioning tendons (banded) for Level P2 PT slab pour #2 between grids 7.5 and 11 from A to F. Gauge pressure was verified according to calibration records provided by Central Steel. Actual tendon elongations were measured and recorded on post tensioning stressing record. Stressing data was compiled, copied and given to Sabey to forward to the engineer of record for his review prior to cutting tendon tails.

Inspected rebar prior to closing forms for Level P2 shear walls on 9-line from C to D and on C and D lines from 9 to 9.4. Rebar is found placed per the shear wall elevations and detail call-outs therein. Okay to close forms. A final clearance inspection is required prior to placing concrete.

Preliminary inspection

INSPECTOR: Mark McBride

REVIEWED BY: Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MAYES ***TESTING ENGINEERS, INC.***

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 80

Date: **11/12/03**
Weather: Cloudy
Inspection: Lab, PT, R/S, epoxy

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested and logging test results and reports into the onsite computer database.

Monitored lift-off stressing of banded tendons on E line from 7.5 to 11 and four distributed tendons per the request of the engineer of record (Ted McDonald) due to short elongations when initially stressed. No elongation was gained on any tendon. Mr. McDonald was notified by Rich Gardner of Sabey. Verbal approval was then given by Mr. McDonald via telephone to cut tendon tails for Level P2 slab, pour #2.

Inspected rebar prior to closing forms for Level P2 shear walls on E.9/F form 7.5 to 11, and on 11 line from A to E. Rebar was found placed per the shear wall elevations and detail callouts therein, except that inside curtain dowels at the floor line will be placed after form closure. Okay to close forms. A final clearance and rebar inspection is required prior to placing concrete.

Observed the installation of (8) #7 rebar dowels into wall on 11-line for trim steel of round opening for the southwest exhaust shaft. Holes were drilled for 12" embedment and cleaned with brush and compressed air prior to installing bars using Hilti HIT HY 150 adhesive.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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EXHIBIT 33

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 81

Date: **11/13/03**
Weather: Cloudy
Inspection: Lab, PT

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested and logging test results and reports into the onsite computer database.

Performed preliminary inspections of reinforcing steel and post tensioning tendons for Level P2 PT slab, pour #1, between grids A and F from 2 to 7.5. Items installed, (bottom mat, wide shallow beams and banded tendons) are in accordance with the approved plans and shop drawings. Installation and inspection of reinforcing steel and post tensioning tendons are ongoing.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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DISCOVERY

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 82

Date: **11/14/03**
Weather: Cloudy
Inspection: Lab, R/C

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested and logging test results and reports into the onsite computer database.

Performed final clearance inspection of rebar prior to concrete placement for Level P2 shear walls on C and D lines from 9 to 9.4 and on 9 line from C to D, and columns at grids 9/B, 10/B and 10.2/C. After some clearance adjustments, okay to place concrete. Contractor placed 45 cubic yards Stoneway concrete mix #6352-a (6000 psi requirement) by pump and by crane and bucket and consolidated mechanically. One sample of concrete was taken and four test cylinders cast.

Also performed final inspection of rebar prior to concrete placement for Level P2 shear walls and pilasters on 11 line from C to E.9 and on E.9/F line from 7.5 to 11. Inside curtain dowels at the floor line are in place and clearances are acceptable. Okay to place concrete. Contractor placed 80 cubic yards of Stoneway concrete mix #4356-a (4000 psi requirement) by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: **Mark A. Galusha, P.E.**

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 83

Date: **11/15/03**
Weather: Cloudy
Inspection: Lab

Permit #: **D03-128**
Performed lab duties that include retrieving test samples from the field cast on 11/14/03, logging samples and reports into the onsite computer database, and introducing samples into water bath cure tanks.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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E3187

MAYES TESTING ENGINEERS, INC.

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MTE No.: E3187
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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: D03-128 / D03-129 (City of Tukwila)

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COMMUNITY DEVELOPMENT

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 84

Date: 11/17/03
Weather: Clouds
Inspection: Lab, PT

Permit #: D03-128
Performed lab duties that include testing samples scheduled to be tested and logging test results and reports into the onsite computer database.

Continued preliminary inspections of reinforcing steel and post tensioning tendons for Level P-2 PT slab pour #1 between grids 2 and 7.5 from A to F. Bottom steel, drop panel steel, wide shallow beams, banded tendons and drag struts are in place. Top and edge reinforcing is in progress. A final inspection of distributed tendons, top steel, edge reinforcing, tendon profiles and clearances is required prior to placing concrete, schedule for Wednesday, 11/19/03.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: 11/18/03
Weather: Clouds
Inspection: Lab, PT

Permit #: D03-128
Performed lab duties that include cleaning testing equipment for use and logging reports into the onsite computer database.

Performed final inspections of reinforcing steel and post tensioning tendons for Level P-2 PT slab pour #1 between grids 2 and 7.5 from A to F. Outstanding and deficient items were addressed and corrected by the contractor upon notification. The engineer of record was also on site at the end of the day to perform a walk-through. No outstanding items were mentioned for correction. Slab is ready to receive concrete scheduled for placement tomorrow, 11/19/03.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MAYES ***TESTING ENGINEERS, INC.***

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ph 503.281.7515
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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 85

Date: **11/19/03**
Weather: Rain
Inspection: Lab, PT

Permit #: **D03-128**

Additional MTE inspectors arrived on site as requested for concrete placement inspections of Level P2 PT slab, pour #1, between grids 2 and 7.5 from A to F. Upon site arrival, MTE was notified by the contractor that concrete placement has been cancelled due to inclement weather. Inspections were re-scheduled for Friday, 11/21, as requested.

Performed laboratory duties that include testing samples scheduled for testing this date and logging test results and reports into onsite computer database.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride,
Chris Pratt, Michael Craig

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 86

Date: **11/20/03**
Weather: Rain
Inspection: Lab, PT

Permit #: **D03-128**

Additional MTE inspectors arrived on site as requested for concrete placement inspections of Level P2 PT slab, pour #1, between grids 2 and 7.5 from A to F. Concrete was monitored at both pumps for correct mix design, slump parameters and casting laboratory-cured cylinders. Concrete was also monitored at the point of placement to direct correction of any displaced items and to cast field cured cylinders (thermocouple system used for field cured cylinders). Contractor placed 621 cubic yards of Stoneway concrete mix #5950-a (5000 psi required) by pump and consolidated mechanically. Four samples of concrete were taken and six test cylinders were cast from each, (4) lab-cured and (2) field-cured.

Performed final inspection of rebar prior to placing concrete for Level P2 shear walls and pilasters on A-line from 8 to 11 and on 11-line from A to B, and the southwest exhaust shaft walls. Rebar is placed per plan elevations, details and approved revisions. Okay to place concrete. Concrete placement is inclusive with mix design and yardage for Level P2 PT slab pour #1. An additional sample of concrete was taken and four test cylinders were cast.

Performed laboratory duties that include testing samples scheduled to be tested this date and logging test results and reports into the onsite computer database.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride, Chris Pratt,
Michael Craig, Yavita Kotomaimoce

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Project: DHS REGIONAL HEADQUARTERS
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 87

Date: **11/21/03**
Weather: Cloudy
Inspection: Lab, PT

Permit #: **D03-128**
Performed laboratory duties that include testing samples scheduled to be tested this date, logging test results and reports into the onsite computer database, retrieving test samples from the field that were cast on 11/20 and introducing those samples into water bath cure tanks.

Set up post tensioning stressing records for Level P-2 PT slab pour #1 between grids 2 and 7.5 from A to F in preparation for stressing, scheduled for Monday, 11/24/03.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 88

Date: **11/24/03**
Weather: Cloudy
Inspection: Lab, PT, R/S

Permit #: **D03-128**

Performed laboratory duties that include retrieving field cured cylinders from the field that were cast on 11/20/03, testing samples scheduled to be tested and logging test results and reports into the onsite computer database.

MTE inspector Charles Edgerton assisted monitoring of the stressing of post tensioning tendons for Level P-2 PT slab pour #1 between grids 2 and 7.5 from A to F. Performed testing of field cured samples prior to start of stressing. Strengths of samples tested were 2840 psi, 2810 psi and 2900 psi. Notified Rich Gardner of Sabey after testing of the second sample and he directed the testing of the third sample. After testing the third sample, Rich elected to halt testing of further field-cured samples until tomorrow, 11/25/03. Stressing will not commence today and was re-scheduled for tomorrow.

Inspected rebar prior to closing forms for Level P-2 columns at grids B/3, 4, 5, 6 and 7; C/2.8; D/2.8, E/2.8, 4, 5, 6 and 7; E.9/4 and 5. Rebar is found placed per column elevations and details. Okay to close forms. A final clearance inspection is required prior to placing concrete.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride,
Charles Edgerton

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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EXHIBIT

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 89

Date: **11/24/03**
Weather: Cloudy
Inspection: Lab, PT, R/S

Permit #: **D03-128**
Performed laboratory duties that include retrieving field cured cylinders from the field that were cast on 11/20/03, testing samples scheduled to be tested and logging test results and reports into the onsite computer database.

MTE inspector Charles Edgerton assisted monitoring of the stressing of post tensioning tendons for Level P-2 PT slab pour #1 between grids 2 and 7.5 from A to F. Performed testing of field cured samples prior to start of stressing. Strengths of samples tested were 3240 psi, 3230 psi, 3240 psi and 3300 psi. Monitored the stressing of tendons at the above-referenced PT slab. Verified the use of calibrated equipment and proper gauge pressure. Actual elongations were measured and recorded on a Post Tensioning Stressing Record. Stressing not completed by the end of the day and will continue tomorrow, 11/26/03.

Inspected rebar prior to placing concrete for pile extensions of piles located south of 11-line at grids B, C, D, E and F. Pile cages were found extended with vertical bars lapped as required. Contractor placed 5 cubic yards of Stonway concrete mix #4358 by crane and bucket and consolidated mechanically.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride,
Charles Edgerton

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Owner: Sabey Corporation
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Contractor: Sabey Construction
Page 90

Date: **11/26/03**
Weather: Cloudy
Inspection: Lab, PT, R/S

Permit #: **D03-128**
Monitored the stressing of remaining tendons for Level P2 PT slab, pour #1, between grids 2 and 7.5 from A to F. Verified the use of calibrated equipment and specified gauge pressure. Actual elongations were measured and recorded on a Post Tensioning Stressing Record (**attached**). Upon completion of stressing, stressing records were compiled from yesterday and today's stressing operations and given to Rich Gardner of Sabey to forward to the engineer of record for review.

Preliminary inspection

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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EXHIBIT 5

Post-Tensioning Stressing Record

Project: DHS Headquarters
Project Location: Tukwila, WA
Pour ID: Level P-2, pour #1

General Contractor: Sabey Const.
Date: 11-25-03 11-26-03
Inspector: M. McBride, C. Edgerton

Equipment Set #1
Ram # 772, 771, 700
Gauge # 1028
Calibration Date: 11-6-03

Equipment Set #2
Ram # 700
Gauge # 1099
Calibration Date: 11-25-03

Equipment Set #3
Ram #
Gauge #
Calibration Date:

Gauge Pressure: 6900 / 7000 Specified Concrete Strength: 3000 Age of Breaks: 4 days Strengths: 3240psi 3300 / 3220 3240

Page 1 of 12

						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
1		143'	11 1/8"	10 1/2	3/4"	23	12"	11	11 1/2	12"	-1/2	Distributed from 2 to 7.5
2				10 3/4		22 3/4		10 3/4	12		0	
3				10 3/4		23 1/4		11 1/4	11 1/2		-1/2	
4				10 1/2		23		11	11 1/2		-1/2	
5				11		22		10	13		1	
6				10 3/4		21 3/4	11 1/2"	10 1/4	12 1/2		1/2	
7				10 1/2		21	10 7/8"	10 1/8	12 3/8		3/8	
8				11		22 5/8	12"	10 5/8	12 3/8		3/8	
9				11		22 1/4		10 1/4	12 3/4		3/4	
10				11 1/4		22 1/4		10 1/4	13		1	
11				10 5/8		21 3/8	11 1/4"	10 1/8	12 1/2		1/2	
12				11 1/8		22 1/2	12"	10 1/2	12 5/8		5/8	
13				11		22 1/2		10 1/2	12 1/2		1/2	
14				11		22 1/4		10 1/4	12 3/4		3/4	
15				10 5/8		22 3/8		10 3/8	12 1/4		1/4	

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Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	First End Gross Δ	First End Mark Δ	First End Net Δ	Second End Gross Δ	Second End Mark Δ	Second End Net Δ	Comments
16		143'	11'1/8"	10 3/4	3/4"	22 3/4	12"	10 3/4	12	12"	0	Cont. Dist. 2 to 7.5
17				11'1/8		22 5/8		10 5/8	12 1/2		1/2	
18				11'1/8		22 3/4		10 3/4	12 3/8		3/8	
19				11		22 5/8		10 5/8	12 3/8		3/8	
20				11'1/8		21 7/8	10 3/4"	11'1/8	12		0	
21				11		22 3/4	12"	10 3/4	12 1/4		1/4	
22				11'1/2		23		11	12 1/2		1/2	
23				11		22 3/4		10 3/4	12 1/4		1/4	
24				11'1/2		23 3/8		11 3/8	12'1/8		1/8	
25				11'1/2		23 1/2		11'1/2	12		0	
26				11 5/8		23 3/8		11 3/8	12 1/4		1/4	
27				11 3/8		23 1/2		11'1/2	11 7/8		-1/8	
28				11 3/8		23 3/8		11 3/8	12		0	
29				11'1/8		23		11	12'1/8		1/8	
30				10 7/8		22 7/8		10 7/8	12		0	
31				11 3/4		23 1/4		11'1/4	12 1/2		1/2	
32				10'1/2		22 1/2		10'1/2	12		0	
33				11 3/8		23 3/8		11 3/8	12 7/8 MM		0	
34				11'1/8		22 1/4		10'1/4	12 7/8		7/8	
35				11 3/4		23 3/8		11 3/8	12 3/8		3/8	
36				11'1/4		22 7/8		10 7/8	12 3/8		3/8	
37				11'1/4		23 1/4		11'1/4	12		0	
38				11 3/8		23 1/8		11'1/8	12 1/4		1/4	
39		↓	↓	11'1/4	↓	23 1/4	↓	11'1/4	12	↓	0	
40		67'	5'1/4"	5	3/8"	17	↓	5				↓ Dist. from stair opening to F.

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Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
41		67'	5 1/4"	47 7/8	3/8"	16 7/8	12"	47 7/8				Cont. dist. from opening to E.
42		↓	↓	5	↓	17	↓	5				↓
43		↓	↓	47 7/8	↓	16 7/8		47 7/8				↓
44		73'	5 5/8	5 1/4	3/8"	17 1/4		5 1/4				↓
45		148'	11 1/2"	113/4	3/4"	235/8		115/8	12 1/8	12"	1/8	Cont. dist. 2 to 7.5
46		↓	↓	11 3/8	↓	23 3/8		11 3/8	12	↓	0	↓
47		↓	↓	11 1/2	↓	23 1/2		11 1/2	12	↓	0	↓
48		↓	↓	11	↓	22 7/8		10 7/8	12 1/8	↓	1/8	↓
49		↓	↓	11 1/8	↓	22 3/4		10 3/4	12 3/8	↓	3/8	↓
50		↓	↓	11 1/8	↓	22 1/2		10 1/2	12 5/8	↓	5/8	↓
51		↓	↓	11 1/8	↓	22 5/8	↓	10 5/8	12 1/2	↓	1/2	↓
52		↓	↓	10 7/8	↓	22	11 1/2"	10 1/2	12 3/8	↓	3/8	↓
53		↓	↓	11 1/8	↓	22 5/8	12"	10 5/8	12 1/2	↓	1/2	↓
54		↓	↓	11 1/4	↓	22 3/4	↓	10 3/4	12 1/2	↓	1/2	↓
55		↓	↓	11 1/8	↓	22 5/8	↓	10 5/8	12 1/2	↓	1/2	↓
56		↓	↓	11 1/8	↓	21 3/4	11 1/2"	10 1/4	12 7/8	↓	7/8	↓
57		↓	↓	11 1/2	↓	22 1/2	12"	10 1/2	13	↓	1	↓
58		↓	↓	11 1/2	↓	23 3/8	↓	11 3/8	12 1/8	↓	1/8	↓
59		↓	↓	11 3/4	↓	23 3/4	↓	11 3/4	12	↓	0	↓
60		↓	↓	11 3/4	↓	23 1/2	↓	11 1/2	12 1/4	↓	1/4	↓
61		↓	↓	11 3/4	↓	23 1/2	↓	11 1/2	12 1/4	↓	1/4	↓
62		↓	↓	12	↓	24	↓	12	12	↓	0	↓
63		↓	↓	11 3/4	↓	23 3/8	↓	11 3/8	12 3/8	↓	3/8	↓
64		↓	↓	11 5/8	↓	23 5/8	↓	11 5/8	12	↓	0	↓
65		↓	↓	11 5/8	↓	23 1/2	↓	11 1/2	12 1/8	↓	1/8	↓

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
66		148'	11 1/2"	11 5/8	3/4"	23 1/2	12"	11 1/2	12 1/8	12"	1/8	Cont. dist. 2 to 7.5.
67				11 7/8		23 5/8		11 5/8	12 1/4		1/4	
68				11 7/8		23 7/8		11 7/8	12		0	
69				11 3/4		23 3/4		11 3/4	12		0	
70				11 1/2		23 1/2		11 1/2	12		0	
71				11		22 7/8	11 7/8"	11	12		0	
72				11 1/2		23 5/8	12"	11 5/8	11 7/8		-1/8	
73				11 1/2		23 3/4		11 3/4	11 3/4		-1/4	
74				10 3/8		20 3/4		8 3/4	13 5/8		1 5/8	3/8" under
75				11 5/8		23 5/8		11 5/8	12		0	
76				11 1/2		23 1/2		11 1/2	12		0	
77				11 1/2		23 1/2		11 1/2	12		0	
78				11 1/2		23 1/2		11 1/2	12		0	
79				11 1/8		23	12 1/8	10 7/8	12 1/4		1/4	
80				11 1/2		23 1/2	12"	11 1/2	12		0	
81				11 1/2		23 3/4		11 3/4	11 3/4		-1/4	
82				10 3/4		23		11	11 3/4		-1/4	
83				11 1/2		23 1/4		11 1/4	12 1/4		1/4	
84				10 7/8		21 1/2	11"	10 1/2	12 3/8		3/8	
85				10 3/4		22 5/8	12"	10 5/8	12 1/8		1/8	
86				11 1/8		23 1/8		11 1/8	12		0	
87				11 1/4		23		11	12 1/4		1/4	
88				11 1/8		23 1/8		11 1/8	12		0	
89				10 3/4		22 3/4		10 3/4	12		0	
90				11 1/8		21	10 1/8"	10 7/8	12 1/4		1/4	

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
91		148'	11 1/2"	11 5/8	3/4"	22 3/8	12"	11 3/8	12 1/4	12"	1/4	Cont. dist. 2 to 7.5.
92				11 1/4		23 1/8		11 1/8	12 1/8		1/8	
93				11 1/4		23		11	12 1/4		1/4	
94				10 1/2		22 1/2		10 1/2	12		0	1/4" under - pulled twice
95		65'	5"	5 1/8	3/8"	17 1/8		5 1/8				Dist. Elev. opening to F
96				5 3/8		17 3/8		5 3/8				
97				5 3/8		17 3/8		5 3/8				
98				5 3/4		17 3/4		5 3/4				3/8" over
99				5 3/4		17 3/4		5 3/4				3/8" over
100				5		17		5				
101				5		17		5				
102				4 7/8		16 7/8		4 7/8				
103				5		17		5				
104				5 1/2		17 1/2		5 1/2				
105		148'	11 1/2"	11 3/4	3/4"	23 3/4		11 3/4	12	12"	0	Cont. dist.
106				11 5/8		23 1/8		11 1/8	12 1/2		1/2	
107				11 1/2		22 1/2	11 1/8	11 3/8	12 1/8		1/8	
108				11		22 7/8	12"	10 7/8	12 1/8		1/8	
109				11 5/8		23 5/8		11 5/8	12		0	
110				11 1/2		23 1/2		11 1/2	12		0	
111				11 1/8		23 1/8		11 1/8	12		0	
112				11 1/2		23 3/8		11 3/8	12 1/8		1/8	
113				10 3/4		21 1/4		9 1/4	13 1/2		1 1/2	
114				11 1/8		21		9	14 1/8		2 1/8	

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
115		65'	5"	5 3/8	3/8"	17 3/8	12"	5 3/8				Dist. Elev. opening to F.
116				5		17		5				
117				5 1/8		17 1/8		5 1/8				
118				5 1/8		17 1/8		5 1/8				
119				5 1/4		17 1/4		5 1/4				
120				5		17		5				
121				5		17		5				
122				5 3/8		17 3/8		5 3/8				
123				5 3/8		17 3/8		5 3/8				
124				5		17		5				
125		148'	11 1/2"	11 7/8	3/4"	23 5/8		11 5/8	12 1/4	12"	1/4	Cont. dist.
126				11 1/8		23 1/8		11 1/8	12		0	
127				11		23		11	12		0	
128				11 3/4		23 3/4		11 3/4	12		0	
129				11 1/2		23 1/2		11 1/2	12		0	
130				11 1/8		23 1/8		11 1/8	12		0	
131				11 3/8		23 3/8		11 3/8	12		0	
132				11		23		11	12		0	
133				10 3/4		21 1/2		9 1/2	13 1/4		1 1/4	
134				11 3/4		23 1/2		11 1/2	12 1/4		1/4	
135				11 3/4		23 1/2		11 1/2	12 1/4		1/4	
136		64'	5"	5	3/8"	17	12"	5				Dist. stair opening to A.
137				4 7/8		16 7/8		4 7/8				
138				4 7/8		16 7/8		4 7/8				
139				4 7/8		16 7/8		4 7/8				

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Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	First End Gross Δ	First End Mark Δ	First End Net Δ	Second End Gross Δ	Second End Mark Δ	Second End Net Δ	Comments
140		64'	5"	4 7/8	3/8"	16 7/8	12"	4 7/8				dist. stair opening to A.
141		63'	4 7/8"	4 3/8	3/8"	15 1/8	10 3/4"	4 3/8				Dist. Elev. openings to A.
142		↓	↓	4 3/4	↓	16 3/4	12"	4 3/4				↓
143				4 7/8		16 7/8	↓	4 7/8				
144				4 1/2		16 1/2		4 1/2				
145		↓	↓	4 3/8	↓	16 3/8		4 3/8				
146		62'	4 3/4"	4 3/8	3/8"	16 3/8		4 3/8				
147		↓	↓	4 3/8	↓	16 3/8		4 3/8				
148				4 1/2		16 1/2		4 1/2				
149				4 3/8		16 3/8		4 3/8				
150		↓	↓	4 3/8	↓	16 3/8	↓	4 3/8				↓
151		169'	13 1/4"	12 1/2	7/8"	24 1/2	12"	12 1/2	12	12"	0	Banded on A line.
152		↓	↓	13 1/8	↓	26 1/8	↓	14 1/8	11	↓	-1	↓
153				13		24		12	13		1	
154				13 1/4		22 1/2		10 1/2	14 3/4		2 3/4	
155				12 1/2		23 1/2		11 1/2	13		1	
156				12 1/2		23 1/2		11 1/2	13		1	
157				13 5/8		23 1/2		11 1/2	14 1/8		2 1/8	
158				12 5/8		25 3/8		13 3/8	11 1/4		- 3/4	
159				12 5/8		25 1/4		13 1/4	11 3/8		- 5/8	
160		↓	↓	12 5/8	↓	24 3/4	↓	12 3/4	11 7/8	↓	- 1/8	↓

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
161		171'	13 3/8"	13 1/8	7/8"	25 3/8	12"	13 3/8	11 3/4	12"	-1/4	Banded on B line
162				12 1/2		24		12	12 1/2		1/2	
163				12 5/8		24 3/4		12 3/4	11 7/8		-1/8	
164				12		23 1/2		11 1/2	12 1/2		1/2	1/2" under - pulled twice
165				13 1/8		25 3/8		13 3/8	11 3/4		-1/4	
166				12 1/2		24 1/2		12 1/2	12		0	
167				12 3/4		24 1/4		12 1/4	12 1/2		1/2	
168				13		25 1/8		13 1/8	11 7/8		-1/8	
169				13 1/4		25 3/8		13 3/8	11 7/8		-1/8	
170				12 1/2		24 3/4		12 3/4	11 3/4		-1/4	
171				13 1/4		25 1/2		13 1/2	11 3/4		-1/4	
172				12 1/2		24 3/4		12 3/4	11 3/4		-1/4	
173				12		24		12	12		0	1/2" under - pulled twice
174				12 1/2		24 1/2		12 1/2	12		0	
175				12 1/2		24 3/4		12 3/4	11 3/4		-1/4	
176				12 3/4		24 7/8		12 7/8	11 7/8		-1/8	
177				13 1/8		24 7/8		12 7/8	12 1/4		1/4	
178				11 1/2		23 1/4		11 1/4	12 1/4		1/4	1" under - pulled twice
179				11 5/8		22 3/8		10 3/8	13 1/4		1 1/4	7/8" under - pulled twice
180				12 7/8		24 7/8		12 7/8	12		0	
181		↓	↓	12 7/8	↓	24 7/8		12 7/8	12	↓	0	
182		44'	3 3/8"	3 3/8	1/4"	15 3/8		3 3/8				ADDEDS stressed at 2 line
183		↓	↓	3 1/4	↓	15 1/4		3 1/4				↓
184		↓	↓	3 3/8	↓	15 3/8	↓	3 3/8				↓

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
185		55'	4 1/4"	4 1/4	1/4"	16 1/4	12"	4 1/4				Cont. Added Banded on
186		↓	↓	4 3/8	↓	16 3/8		4 3/8				B line stressed at 7.5
187		↓	↓	4 1/8	↓	16 1/8		4 1/8				line.
188		169'	13 1/4"	13 1/8	7/8"	25 1/8		13 1/8	12	12"	0	Banded on C line
189				13 1/8		25 1/8		13 1/8	12		0	
190				13 1/8		25 1/4		13 1/4	11 7/8		-1/8	
191				13 1/8		25 1/8		13 1/8	12		0	
192				13 1/8		25		13	12 1/8		1/8	
193				13 1/4		25 1/4		13 1/4	12		0	
194				13 1/8		25 1/8		13 1/8	12		0	
195				12 7/8		25		13	11 7/8		-1/8	
196				12 7/8		24 3/4		12 3/4	12 1/8		1/8	
197				12		23		11	13		1	
198				11 5/8		22 1/8		10 1/8	13 1/2		1 1/2	
199				12 1/2		22 3/4		10 3/4	13 3/4		3/4	
200				12 1/4		22 1/2		10 1/2	13 3/4		3/4	
201				11 1/2		22 1/4		10 1/4	13 1/4		1 1/4	
202				12 1/2		22 3/4		10 3/4	13 3/4		3/4	
203				12		22 1/2		10 1/2	13 1/2		1 1/2	
204				11 5/8		22 5/8		10 5/8	13		1	
205				11 1/2		21 3/4		9 3/4	13 3/4		3/4	
206				11 1/2		22		10	13 1/2		1 1/2	
207				11 5/8		22 5/8		10 5/8	13		1	
208		↓	↓	11 3/4	↓	22 3/4	↓	10 3/4	13	↓	1	↓
209		55'	4 1/4"	4 1/8	1/4"	16 1/8	↓	4 1/8				Added on C line.

MAYES TESTING ENGINEERS

Mayes 901 Rev 4-93

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
Z10		55'	4 1/4"	4	1/4"	16	12"	4				Added Banded on C line
Z11		125'	9 7/8"	9 1/4	5/8"	21 1/4		9 1/4				
Z12		↓	↓	9 1/4	↓	21 1/4		9 1/4				
Z13		↓	↓	8 3/4	↓	20 3/4		8 3/4				1/2" under-pulled twice
Z14		55'	4 1/4"	4	1/4"	16		4				
Z15		169'	13 3/4"	12 5/8	7/8"	24		12	12 5/8	12"	5/8	Banded on D line
Z16				12 3/8		24 1/8		12 1/8	12 1/4		1/4	
Z17				11 7/8		22		10	13 7/8		1 7/8	
Z18				12		23 1/2		11 1/2	12 1/2		1/2	
Z19				12 3/8		24		12	12 3/8		3/8	
Z20				12 5/8		23 5/8		11 5/8	13		1	
Z21				12 1/4		23 1/2		11 1/2	12 3/4		3/4	
Z22				12 1/4		23 3/4		11 3/4	12 1/2		1/2	
Z23				12 1/2		24 1/8		12 1/8	12 3/8		3/8	
Z24				12 3/8		24		12	12 3/8		3/8	
Z25				12 1/2		23 3/4		11 3/4	12 3/4		3/4	
Z26				12 3/8		24		12	12 3/8		3/8	
Z27				12 3/8		23 7/8		11 7/8	12 1/2		1/2	
Z28				12 1/2		24		12	12 1/2		1/2	
Z29				12		23 1/8		11 1/8	12 7/8		7/8	
Z30				12 1/8		22 1/2		10 1/2	13 5/8		1 5/8	
Z31				12 1/2		24		12	12 1/2		1/2	
Z32				11		20 1/2		~~8~~ 10 1/2	14 1/2		2 1/2	
Z33				11		20 1/2		~~8~~ 10 1/2	14 1/2		2 1/2	
Z34		↓	↓	11	↓	21	↓	9	14	↓	2	

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MAYES TESTING ENGINEERS

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
235		169'	13 1/4"	11	7/8"	21	12"	9	14	12"	2	Cont. Banded on D line
236		125'	9 7/8"	9 1/4	5/8"	21 1/4		9 1/4				ADDED 5
237		↓	↓	9 3/8	↓	21 3/8		9 3/8				
238		↓	↓	9 1/4	↓	21 1/4		9 1/4				
239		55'	4 1/4"	4	1/4"	16		4				
240		↓	↓	4	↓	16		4				
241		↓	↓	4	↓	16		4				
242		169'	13 1/4"	12	7/8"	22 3/4		10 3/4	13 1/4	12"	1 1/4	Banded on E line
243				11 3/4		22 3/8		10 3/8	13 3/8		1 3/8	
244				11 1/2		23		11	12 1/2		1/2	
245				11 1/2		22 1/2		10 1/2	13		1	
246				11 1/2		22 1/2		10 1/2	13 1/2		1 1/2	
247				12		23		11	13		1	
248				12		23 1/2		11 1/2	12 1/2		1/2	
249				11 3/4		23 1/4		11 1/4	12 1/2		1/2	
250				12 3/4		23 3/4		11 3/4	13		1	
251				12 1/4		23 1/2		11 1/2	12 3/4		3/4	
252				12		23 7/8		11 7/8	12 1/8		1/8	
253				12 1/8		23 3/8		11 3/8	12 3/4		3/4	
254				11 3/8		23 3/8		11 3/8	12		0	
255				11 3/4		23 1/2		11 1/2	12 1/4		1/4	
256				12		23 3/4		11 3/4	12 1/4		1/4	
257				11 7/8		23		11	12 7/8		7/8	
258				11 3/4		23		11	12 3/4		3/4	
259		↓	↓	11 7/8	↓	23 3/8	↓	11 3/8	12 1/2	↓	1/2	↓

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						First End			Second End			
Sequence No.	Tendon ID	Tendon Length	Calc Δ	Actual Δ	Tolerances +/-	Gross Δ	Mark Δ	Net Δ	Gross Δ	Mark Δ	Net Δ	Comments
260		169'	13 1/4"	12 5/8	7/8"	24	12"	12	12 5/8	12"	5/8	Cont. Banded on E line
261		↓	↓	11 5/8	↓	23 1/8	↓	11 1/8	12 1/2	↓	1/2	
262		↓	↓	11 5/8	↓	23 3/4	↓	11 3/4	11 7/8	↓	-1/8	
263		55'	4 1/4"	4 1/8	1/4"	~~23 5/16~~	↓	4 1/8	X	X	X	ADDEDS
264		↓	↓	4 1/4	↓	16 1/4	↓	4 1/4	X	X	X	↓
265		↓	↓	4 3/8	↓	16 3/8	↓	4 3/8	X	X	X	↓
266		↓	↓	4 3/8	↓	16 3/8	↓	4 3/8	X	X	X	↓
267		↓	↓	4	↓	16	↓	4	X	X	X	↓
268		↓	↓	4 1/4	↓	16 1/4	↓	4 1/4	X	X	X	↓
269		170'	13 1/4"	11 1/4	7/8"	22 1/2	12"	10 1/2	12 3/4	12"	3/4	Banded on F line.
270		↓	↓	11 3/8	↓	22 5/8	↓	10 5/8	12 3/4	↓	3/4	↓
271		↓	↓	11 1/2	↓	22 3/4	↓	10 3/4	12 3/4	↓	3/4	↓
272		↓	↓	11 3/8	↓	22 1/8	↓	10 1/8	13 1/4	↓	1 1/4	↓
273		↓	↓	11 1/8	↓	22 1/8	↓	10 1/8	13	↓	1	↓
274		↓	↓	11 1/8	↓	21 1/8	↓	9 1/8	14	↓	2	↓
275		↓	↓	11 1/2	↓	22	↓	10	13 1/2	↓	1 1/2	↓
276		↓	↓	11	↓	22 1/4	↓	10 1/4	12 3/4	↓	3/4	↓
277		↓	↓	11 1/8	↓	21 3/4	↓	9 3/4	13 3/8	↓	1 3/8	↓
278		↓	↓	11 3/8	↓	22	↓	10	13 3/8	↓	1 3/8	↓

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
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RECEIVED
NOV 10 2003
COMMUNITY DEVELOPMENT

Date: **10/28/03**
Weather: Cloudy
Inspection: Lab, R/S, epoxy

Permit #: **D03-128**

Performed lab duties to include retrieving test samples from the field that were cast on 10/27/03, logging samples and reports into the onsite computer database, and introducing samples into water bath cure tanks.

Observed the installation of (8) #7 vertical rebar dowels into thickened slab at the north side of door opening in blast walls due to door dimension change. Holes were drilled for 8" embedment and cleaned with brush and compressed air prior to installing dowels using Hilti HIT HY-150 adhesive.

Inspected rebar prior to closing forms for the remaining portion of blast walls to include door opening. Rebar has been reconfigured and lap-spliced at door header and north side of door opening due to dimensional changes. Okay to close forms. A final clearance inspection is required prior to placing concrete.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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CITY OF TUKWILA

MAYES ***TESTING ENGINEERS, INC.***

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 71

Date: **10/29/03**
Weather: Cloudy
Inspection: Lab, R/S, epoxy

Permit #: **D03-128**
Performed lab duties to include testing samples scheduled to be tested on this date and logging test results and reports into the onsite computer database.

Observed the installation of #7 vertical rebar dowels into grade beam on A-line between grids 3 and 4 per RFI #067. Holes were drilled for 12" embedment and cleaned with brush and compressed air prior to installing dowels using Hilti HIT HY-150 adhesive.

Inspected rebar prior to closing forms for Level P-3 shear wall on A line between grids 3 and 4. Okay to close forms. A final clearance inspection is required prior to placing concrete.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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EXHIBIT 1

MAYES ***TESTING ENGINEERS, INC.***

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fax 425.745.1737

Tacoma Office
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ph 253.584.3720
fax 253.584.3707

Portland Office
7911 NE 33rd Drive
Suite 190
Portland, OR 97211
ph 503.281.7515
fax 503.281.7579

MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 72

Date: **10/30/03**
Weather: Cloudy
Inspection: Lab, R/C, epoxy

Permit #: **D03-128**
Performed lab duties to include testing samples scheduled to be tested on this date and logging test results and reports into the onsite computer database.

Observed the installation of #4 horizontal rebar dowels into shear walls for the northwest exhaust shaft wall connections. Holes were drilled for 8" embedment at 10" o.c. and cleaned with brush and compressed air prior to installing dowels using Hilti HIT HY-150 adhesive.

Inspected rebar for a final inspection prior to placing concrete for remaining portion of blast walls; Level P3 shear wall on A-line from 3 to 4; Level P3 northwest exhaust shaft walls; and stem wall on 2.2 line from A to C.4. Contractor placed 31 cubic yards Stoneway concrete mix #44356-a (4000 psi) in these locations by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 73

Date: **10/31/03**
Weather: Clear
Inspection: Lab

Permit #: **D03-128**
Performed lab duties to include retrieving test samples from the field that were cast on 10/30/03, testing samples scheduled to be tested on this date, logging test results and reports into the onsite computer database, and introducing samples into water bath cure tanks.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: **11/03/03**
Weather: Clear
Inspection: Lab

Permit #: **D03-128**
Performed lab duties to include testing samples scheduled to be tested on this date and logging test results and reports into the onsite computer database.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 74

Date: **11/04/03**
Weather: Clear
Inspection: PT

Permit #: **D03-128**
Performed inspections of reinforcing steel and post tensioning tendons for Level P-2 PT slab, pour #2. Inspected rebar for size, grade, laps, number, spacing and clearances per S1.2-R and detail call-outs therein. Inspected post tensioning tendons for number, spacing, profiles, clearances and additional rebar per S1.2-PT and detail call-outs therein and details on S0.2. Punch list items were corrected upon request.

Performed walk-through with the engineer of record for the above-referenced PT slab. Engineer is satisfied with the installation of reinforcing steel and post tensioning tendons. This slab is ready to receive concrete, scheduled for placement tomorrow, 11/5/03.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 75

Date: **11/05/03**
Weather: Clear
Inspection: PT

Permit #: **D03-128**

Monitored placement of 369 cubic yards of Stoneway concrete mix #5950-a (5000 psi required) for Level P-2 PT slab, pour #2, bounded by grids 7.5 and 11 from A to F. Concrete was monitored both at the point of discharge (pump hopper) for mix design and slump requirements, and at the point of placement (deck) for correction of displaced items and consolidation efforts. Concrete was placed by pump and consolidated mechanically by means of internal vibration. Three samples of concrete were taken and (7) test cylinders were cast from each (4 lab cured and 3 field cured). A thermocouple system is provided by MTE for field-cured cylinders for representative curing prior to testing cylinders for stressing.

Performed laboratory duties, which include testing samples scheduled to be tested and logging test results and reports into the onsite computer database.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride,
Michael Craig

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 76

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NOV 14 2003
COMMUNITY DEVELOPMENT

Date: **11/06/03**
Weather: Clear
Inspection: R/S, lab

Permit #: **D03-128** Final D

Performed lab duties to include retrieving test samples from the field that were cast on 11/5/03, testing samples scheduled to be tested, logging test results and reports into the onsite computer database, and introducing samples into water bath cure tanks.

Inspected rebar prior to closing forms for Level P2 columns at grids B/8, 9, 10; C/8, 10.2; E/8, 9, 10.2; and E.9/8 and 9. Rebar is placed per the column elevations and details. Okay to close forms. A final clearance inspection is required prior to placing concrete.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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03-128

Analysis of Strength Data

Tests and Statistics for Job Number E3187

Mix Number 4356-a Produced By Stoneway

Test Data From 10/20/2003 To 10/31/2003

Design Strength (f'c)

Age = 28

Specimen size: 4 x 8 CYLINDER

D03-125

WR

Sample Number	*Date Made*	*Sample Temp(°F)*	*Slump (inch)*	*W/C Ratio*	*Average Strength (psi)*	*3-Test Ave. (psi)*	*Remarks*
0014	9/22/2003	75	6.25"	0.438	4,460		
0016	9/25/2003	70	6.5"	0.420	4,280		
0019	10/1/2003	71	5.25"	0.422	5,000	4,580	
0021	10/3/2003	70	6.0"	0.420	4,000	4,430	
0022	10/3/2003	71	6.75"	0.430	3,910	4,300	

28 *Day Test Statistics*

Number of tests:	5		
Low test:	3,909	Within-test standard deviation:	43.17
High test:	4,998	Batch-to-batch standard deviation:	430.83
Average test:	4,331	Within-test coefficient of variation:	1.00
Median test:	4,003	Standard deviation:	432.99
Average range:	49	Coefficient of variation:	10.00

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s): D03-128

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 63 ° F
Weather: Clear
Product: Concrete
Supplier: Stoneway
Ticket Number : 350600
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
75 ° F	6.25"	%

Water / Cement Ratio:	Date Received
0.438	9-23-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,913.0 lbs
Fine Aggregate	1,460.0 lbs
Cement--Type I	400.0 lbs
Fly Ash	100.0 lbs
Water	219.0 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Shear walls from the foundation to level P-2 on 9 line from C to D and on C and D lines from 9 to 9.5. Sampled at 9 of 42 cubic yards.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
9/22/2003	0014	0072	9/29/2003	7	42720	4 x 8	4.03	12.76	3350
9/22/2003	0014	0073	10/20/2003	28	56765	4 x 8	4.03	12.76	4450
9/22/2003	0014	0074	10/20/2003	28	56960	4 x 8	4.03	12.76	4470
9/22/2003	0014	0075	10/20/2003	28	57065	4 x 8	4.03	12.76	4470

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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DCD 03-03

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s): D03-128

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 54 °F
Weather: Clear
Product: Concrete
Supplier: Stoneway
Ticket Number : 351679
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
70 ° F	6.5"	%

Water / Cement Ratio:	Date Received
0.420	9-26-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,918.0 lbs
Fine Aggregate	1,471.0 lbs
Cement--Type I	403.0 lbs
Fly Ash	101.0 lbs
Water	211.7 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Level P-3 shear walls at stair #2. Sampled at 10 of 56 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
9/25/2003	0016	0080	10/2/2003	7	41875	4 x 8	4.03	12.76	3280
9/25/2003	0016	0081	10/23/2003	28	53565	4 x 8	4.02	12.69	4220
9/25/2003	0016	0082	10/23/2003	28	55295	4 x 8	4.02	12.69	4360
9/25/2003	0016	0083	10/23/2003	28	54085	4 x 8	4.02	12.69	4260

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s): D03-128

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 54 ° F
Weather: Clear
Product: Concrete
Supplier: Stoneway
Ticket Number : 351679
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
70 ° F	6.5"	%

Water / Cement Ratio:	Date Received
0.420	9-26-03

Placement Location and Notes:
Level P-3 shear walls at stair #2. Sampled at 10 of 56 cubic yards placed.

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,918.0 lbs
Fine Aggregate	1,471.0 lbs
Cement--Type I	403.0 lbs
Fly Ash	101.0 lbs
Water	211.7 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
9/25/2003	0016	0080	10/2/2003	7	41875	4 x 8	4.03	12.76	3280
9/25/2003	0016	0081	10/23/2003	28	53565	4 x 8	4.02	12.69	4220
9/25/2003	0016	0082	10/23/2003	28	55295	4 x 8	4.02	12.69	4360
9/25/2003	0016	0083	10/23/2003	28	54085	4 x 8	4.02	12.69	4260

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128
D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 54 ° F
Weather: Overcast
Product: Concrete
Supplier: Stoneway
Ticket Number : 353457
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
71 ° F	5.25"	%

Water / Cement Ratio:	Date Received
0.422	10-2-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,876.0 lbs
Fine Aggregate	1,485.0 lbs
Cement--Type I & II	398.0 lbs
Fly Ash	100.0 lbs
Water	210.0 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Perimeter walls and pilasters on E.9 and F lines from 6.8 to 11 and 11 line from E.8 to E.9. Grade beams on D and E lines from 9 to 11, 10.2 line from D to E and angled grade beam from grids 10.2/E to 10/E.9. Sampled at 20 of 80 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (days)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/1/2003	0019	0092	10/8/2003	7	46000	4 x 8	4.03	12.72	3620
10/1/2003	0019	0093	10/29/2003	28	63465	4 x 8	4.03	12.74	4980
10/1/2003	0019	0094	10/29/2003	28	64180	4 x 8	4.03	12.74	5040
10/1/2003	0019	0095	10/29/2003	28	63410	4 x 8	4.03	12.74	4980

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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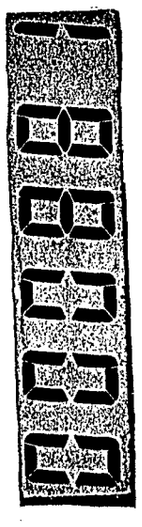

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128
D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 54 °F
Weather: Overcast
Product: Concrete
Supplier: Stoneway
Ticket Number : 353457
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
71 °F	5.25"	%

Water / Cement Ratio:	Date Received
0.422	10-2-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,876.0 lbs
Fine Aggregate	1,485.0 lbs
Cement--Type I & II	398.0 lbs
Fly Ash	100.0 lbs
Water	210.0 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Perimeter walls and pilasters on E.9 and F lines from 6.8 to 11 and 11 line from E.8 to E.9. Grade beams on D and E lines from 9 to 11, 10.2 line from D to E and angled grade beam from grids 10.2/E to 10/E.9. Sampled at 20 of 80 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/1/2003	0019	0092	10/8/2003	7	46000	4 x 8	4.03	12.72	3620
10/1/2003	0019	0093	10/29/2003	28	63465	4 x 8	4.03	12.74	4980
10/1/2003	0019	0094	10/29/2003	28	64180	4 x 8	4.03	12.74	5040
10/1/2003	0019	0095	10/29/2003	28	63410	4 x 8	4.03	12.74	4980

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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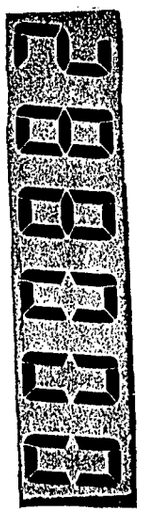

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128
D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 56 °F
Weather: Overcast
Product: Concrete
Supplier: Stoneway
Ticket Number : 354299
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
70 °F	6.0"	%

Water / Cement Ratio:	Date Received
0.420	10-4-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,914.0 lbs
Fine Aggregate	1,468.0 lbs
Cement--Type I	397.3 lbs
Fly Ash	101.8 lbs
Water	209.6 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Level P-3 main elevator core walls. Grade beams at the following locations: 9 line from D to E.9 and A to B; C line from 2 to 4 and from 10.2 to 11; B line from 2 to 3, 4 to 5 and 9 to 11; D line from 2 to 4; E line from 2 to 4; 4 line from D to E.9; 2.8 line from C to E; 10 line from A to B; 10.2 line from C to D; and angled grade beams from gridpoints 10/B to 10.2/C, 2.8/E to 3/E.9 and 2.8/C to 3/B. Set #1 cast at 32 of 201 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/3/2003	0021	0100	10/10/2003	7	33485	4 x 8	4.03	12.76	2630
10/3/2003	0021	0101	10/31/2003	28	50710	4 x 8	4.02	12.69	4000
10/3/2003	0021	0102	10/31/2003	28	50965	4 x 8	4.02	12.69	4020
10/3/2003	0021	0103	10/31/2003	28	50670	4 x 8	4.02	12.69	3990

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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Everett Office
917-134th Street SW
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Everett, WA 98204
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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128
D03-129

UR

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 62 °F
Weather: Partly Cloudy
Product: Concrete
Supplier: Stoneway
Ticket Number : 354555
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
71 °F	6.75"	%

Water / Cement Ratio:	Date Received
0.430	10-4-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,914.4lbs
Fine Aggregate	1,468.5lbs
Cement--Type I	405.0 lbs
Fly Ash	100.0 lbs
Water	217.3 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Level P-3 main elevator core walls. Grade beams at the following locations: 9 line from D to E.9 and A to B; C line from 2 to 4 and from 10.2 to 11; B line from 2 to 3, 4 to 5 and 9 to 11; D line from 2 to 4; E line from 2 to 4; 4 line from D to E.9; 2.8 line from C to E; 10 line from A to B; 10.2 line from C to D; and angled grade beams from gridpoints 10/B to 10.2/C, 2.8/E to 3/E.9 and 2.8/C to 3/B. Set #2 cast at 156 of 201 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/3/2003	0022	0104	10/10/2003	7	31840	4 x 8	4.03	12.76	2500
10/3/2003	0022	0105	10/31/2003	28	49595	4 x 8	4.02	12.69	3910
10/3/2003	0022	0106	11/28/2003	56		4 x 8			
10/3/2003	0022	0107	11/28/2003	56		4 x 8			

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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Everett Office
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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s): WR
D03-128
D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 65 ° F
Weather: Partly Cloudy
Product: Concrete
Supplier: Stoneway
Ticket Number : 355063
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
71 ° F	6.5"	%

Water / Cement Ratio:	Date Received
0.413	10-7-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,917.7lbs
Fine Aggregate	1,469.2lbs
Cement--Type I	398.2 lbs
Fly Ash	100.9 lbs
Water	206.2 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Level P-3 shear wall and pilasters on 11 line from A to E.8. Grade beams at the following locations: 8 line from B to E; B, C, D and E lines from 8 to 9; and 5, 6 and 7 lines from E to F. Sampled at 21 of 115 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/6/2003	0023	0108	10/13/2003	7	30930	4 x 8	4.03	12.76	2420
10/6/2003	0023	0109	10/20/2003	14	39185	4 x 8	4.03	12.76	3070
10/6/2003	0023	0110	11/3/2003	28		4 x 8			
10/6/2003	0023	0111	11/3/2003	28		4 x 8			

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by: MMcB

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EARLY ST[illegible]
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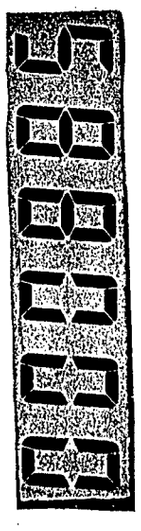

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Everett, WA 98204
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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128
D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 58 ° F
Weather: Occasional Showers
Product: Concrete
Supplier: Stoneway
Ticket Number : 355893
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
67 ° F	5.75"	%

Water / Cement Ratio:	Date Received
0.428	10-9-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,918.4lbs
Fine Aggregate	1,464.1lbs
Cement--Type I	396.0 lbs
Fly Ash	100.0 lbs
Water	212.4 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Below grade portion of shear wall and pilasters on A line from 5.3 to 7.7. Grade beams on 8 line from E to E.9 and on E line from 4 to 6 and from 7 to 8. Sampled at 10 of 31 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/8/2003	0024	0112	10/15/2003	7	34095	4 x 8	4.02	12.69	2690
10/8/2003	0024	0113	11/5/2003	28		4 x 8			
10/8/2003	0024	0114	11/5/2003	28		4 x 8			
10/8/2003	0024	0115	11/5/2003	28		4 x 8			

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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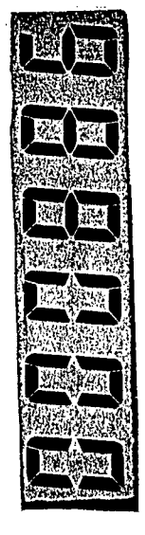

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s): D03-128

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 56 °F
Weather: Occasional Showers
Product: Concrete
Supplier: Stoneway
Ticket Number : 356227
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
64 ° F	7.0"	%

Water / Cement Ratio:	Date Received
0.442	10-10-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,914.9 lbs
Fine Aggregate	1,461.5 lbs
Cement--Type I	396.7 lbs
Fly Ash	98.9 lbs
Water	219.2 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Level P-3 walls and pilasters on E.9/F lines from 2 to 6.8 and on 2 line from D.5 to E.9. Sampled at 9 of 93 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/9/2003	0025	0116	10/16/2003	7	26585	4 x 8	4.02	12.69	2090
10/9/2003	0025	0117	10/23/2003	14	35135	4 x 8	4.02	12.69	2770
10/9/2003	0025	0118	11/6/2003	28		4 x 8			
10/9/2003	0025	0119	11/6/2003	28		4 x 8			

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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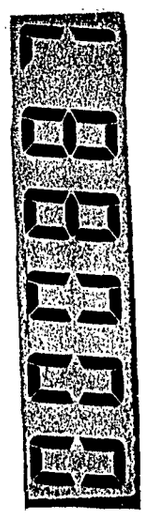

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128
D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 54 °F
Weather: Cloudy
Product: Concrete
Supplier: Stoneway
Ticket Number : 356757
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
64 °F	5.75"	%

Water / Cement Ratio:	Date Received
0.425	10-11-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,914.4lbs
Fine Aggregate	1,465.4lbs
Cement--Type I	406.0 lbs
Fly Ash	102.0 lbs
Water	215.9 lbs
WRDA-64	15.0 Oz
ADVA	30.0 Oz

Design Strength (f'c): 3000 at 28 days

Placement Location and Notes:

Slab on grade between grids A.2 and E.9/F from 9 to 11 and between B and F from 8 to 9. Grade beams for the SW exhaust shaft and grade beam on C line from 9 to 11. Set #1 cast at 64 of 257 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/10/2003	0026	0120	10/17/2003	7	37440	4 x 8	4.02	12.69	2950
10/10/2003	0026	0121	11/7/2003	28		4 x 8			
10/10/2003	0026	0122	11/7/2003	28		4 x 8			
10/10/2003	0026	0123	11/7/2003	28		4 x 8			

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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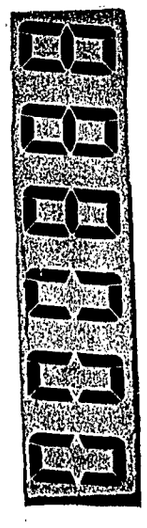

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128
D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 56 °F
Weather: Cloudy
Product: Concrete
Supplier: Stoneway
Ticket Number : 356725
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
62 °F	6.25"	%

Water / Cement Ratio:	Date Received
0.417	10-11-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,917.7lbs
Fine Aggregate	1,451.7lbs
Cement--Type I	400.9 lbs
Fly Ash	100.0 lbs
Water	208.8 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 3000 at 28 days

Placement Location and Notes:

Slab on grade between grids A.2 and E.9/F from 9 to 11 and between B and F from 8 to 9. Grade beams for the SW exhaust shaft and grade beam on C line from 9 to 11. Set #2 cast at 187 of 257 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/10/2003	0027	0124	10/17/2003	7	31930	4 x 8	4.02	12.69	2520
10/10/2003	0027	0125	11/7/2003	28		4 x 8			
10/10/2003	0027	0126	11/7/2003	28		4 x 8			
10/10/2003	0027	0127	11/7/2003	28		4 x 8			

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128
D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 62 °F
Weather: Partly Cloudy
Product: Concrete
Supplier: Stoneway
Ticket Number : 357731
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
65 ° F	5.5"	%

Water / Cement Ratio:	Date Received
0.400	10-15-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,874.0 lbs
Fine Aggregate	1,481.6 lbs
Cement--Type I & II	399.0 lbs
Fly Ash	99.0 lbs
Water	199.0 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz
Daraset	64.0 Oz

Design Strength (f'c): 3000 at 28 days

Placement Location and Notes:

Slab on grade between grids A and C from 5.5 to 7.3, including thickened areas for blast walls. Slabs on grade for elevator #'s 2, 3 and 5 pits and for storage room P312. Grade beams on grids 6 and 7 from A to C and on B line from 5 to 8. Sampled at 10 of 127 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/14/2003	0028	0128	10/21/2003	7	50355	4 x 8	4.02	12.69	3970
10/14/2003	0028	0129	11/11/2003	28		4 x 8			
10/14/2003	0028	0130	11/11/2003	28		4 x 8			
10/14/2003	0028	0131	11/11/2003	28		4 x 8			

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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CONCRETE LABORATORY TEST REPORT

Project :	DHS Regional Headquarters	Project No:	E3187	Permit # (s):
Client:	Sabey Corporation	Issued on:	11-4-03	D03-128
Contractor	Sabey Construction	Original: ☑		D03-129
		Revised: ☐		

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 53 ° F
Weather: Rain
Product: Concrete
Supplier: Stoneway
Ticket Number : 358429
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
62 ° F	6.5"	%

Water / Cement Ratio:	Date Received
0.407	10-17-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,918.4lbs
Fine Aggregate	1,466.0lbs
Cement--Type I	399.0 lbs
Fly Ash	101.0 lbs
Water	203.4 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Level P-3 shear walls and pilasters on A line from 2 to 3 and from approximately 7.2 to 11 and on 2 line from A to D.5. Grade beam on C line from 7 to 8. Sampled at 10 of 126 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (days)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/16/2003	0029	0132	10/23/2003	7	30975	4 x 8	4.02	12.69	2440
10/16/2003	0029	0133	11/13/2003	28		4 x 8			
10/16/2003	0029	0134	11/13/2003	28		4 x 8			
10/16/2003	0029	0135	11/13/2003	28		4 x 8			

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride Reviewed by:

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EARLY STRENGTH
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EXHIBIT

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128
D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 67 ° F
Weather: Partly Cloudy
Product: Concrete
Supplier: Stoneway
Ticket Number : 358981
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
67 ° F	5.25"	%

Water / Cement Ratio:	Date Received
0.391	10-18-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,917.0 lbs
Fine Aggregate	1,471.7 lbs
Cement--Type I	406.7 lbs
Fly Ash	100.0 lbs
Water	198.1 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Blast walls on 5.5 line from A to C and on 7.3 line from A to B and 8" walls on 7.3 line from B to C and C line from 7 to 7.3 all from elevation -3'-0" to 0'-0". Grade beams on 6 and 7 lines from D to E, D line from 4 to 5.4 and from 7 to 8 and angled grade beam from E/5 to D/5.4. Sampled at 9 of 49 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/17/2003	0030	0136	10/24/2003	7	40945	4 x 8	4.02	12.67	3230
10/17/2003	0030	0137	11/14/2003	28		4 x 8			
10/17/2003	0030	0138	11/14/2003	28		4 x 8			
10/17/2003	0030	0139	11/14/2003	28		4 x 8			

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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MAYES TESTING ENGINEERS, INC

Everett Office
917-134th Street SW
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Everett, WA 98204
ph 425.742.9360
fax 425.745.1737

CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s): D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 62 °F
Weather: Cloudy
Product: Concrete
Supplier: Stoneway
Ticket Number : 359964
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
66 °F	5.75"	%

Water / Cement Ratio:	Date Received
0.388	10-23-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,902.9 lbs
Fine Aggregate	1,468.6 lbs
Cement--Type I	390.0 lbs
Fly Ash	103.3 lbs
Water	191.3 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Footings and stem walls on approximate grids C.3 from 6.3 to 6.7 and on 6.3 from C.7 to D. Sampled at 3 of 3 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/22/2003	0031	0140	10/29/2003	7	33730	4 x 8	4.03	12.74	2650
10/22/2003	0031	0141	11/19/2003	28		4 x 8			
10/22/2003	0031	0142	11/19/2003	28		4 x 8			
10/22/2003	0031	0143	11/19/2003	28		4 x 8			

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128
D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 60 ° F
Weather: Partly Cloudy
Product: Concrete
Supplier: Stoneway
Ticket Number : 360272
MixDesign ID : 4356-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
64 ° F	6.25"	%

Water / Cement Ratio:	Date Received
0.418	10-24-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,915.6 lbs
Fine Aggregate	1,465.1 lbs
Cement--Type I	403.6 lbs
Fly Ash	100.0 lbs
Water	210.5 lbs
WRDA-64	30.0 Oz
ADVA	15.0 Oz

Design Strength (f'c): 4000 at 28 days

Placement Location and Notes:

Blast walls. Level P-3 shear wall and pilasters on A line from 4 to 5.5. Grade beams on 3, 4 and 5 lines from A to B and grade beam from grid points C/5.4 to B/5. Sampled at 11 of 73 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/23/2003	0032	0144	10/30/2003	7	35140	4 x 8	4.03	12.76	2750
10/23/2003	0032	0145	11/20/2003	28		4 x 8			
10/23/2003	0032	0146	11/20/2003	28		4 x 8			
10/23/2003	0032	0147	11/20/2003	28		4 x 8			

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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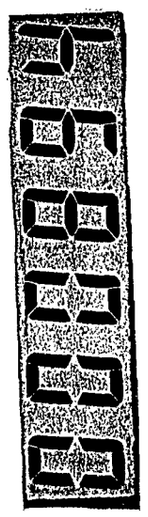

Analysis of Strength Data

Tests and Statistics for Job Number E3187

Mix Number 5950-a Produced By Stoneway

Test Data From 10/20/2003 To 10/24/2003

Design Strength (f'c)

Age = 28

Specimen size: 4 x 8 CYLINDER

D03-128

WR

Sample Number	*Date Made*	*Sample Temp(°F)*	*Slump (inch)*	*W/C Ratio*	*Average Strength (psi)*	*3-Test Ave. (psi)*	*Remarks*
0013	9/22/2003	75	6.75"	0.382	5,860		
0015	9/24/2003	73	5.5"	0.339	6,820		
0017	9/26/2003	74	5.75"	0.352	6,550	6,410	

28 *Day Test Statistics*

Number of tests:	3		
Low test:	5,856	Within-test standard deviation:	152.13
High test:	6,819	Batch-to-batch standard deviation:	473.64
Average test:	6,409	Within-test coefficient of variation:	2.37
Median test:	6,552	Standard deviation:	497.47
Average range:	172	Coefficient of variation:	7.76

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 63 °F
Weather: Clear
Product: Concrete
Supplier: Stoneway
Ticket Number : 350556
MixDesign ID : 5950-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
75 °F	6.75"	%

Water / Cement Ratio:	Date Received
0.382	9-23-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,955.0 lbs
Fine Aggregate	1,239.0 lbs
Cement--Type I	547.0 lbs
Fly Ash	112.0 lbs
Water	252.0 lbs
WRDA-64	26.5 Oz
ADVA	13.0 Oz

Design Strength (f'c): 5000 at 28 days

Placement Location and Notes:

Columns from the foundation to level P-2 at grids B/10, C/10.2, D/10.2, E/10.2, B/9, E/9, E/8 and D/8. Sampled at 6 of 12 cubic yards.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
9/22/2003	0013	0068	9/29/2003	7	57820	4 x 8	4.03	12.76	4530
9/22/2003	0013	0069	10/20/2003	28	73705	4 x 8	4.03	12.76	5780
9/22/2003	0013	0070	10/20/2003	28	75760	4 x 8	4.03	12.76	5940
9/22/2003	0013	0071	10/20/2003	28	74615	4 x 8	4.03	12.76	5850

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128
D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 54 ° F
Weather: Clear
Product: Concrete
Supplier: Stoneway
Ticket Number : 351201
MixDesign ID : 5950-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
73 ° F	5.5"	%

Water / Cement Ratio:	Date Received
0.339	9-25-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,963.0 lbs
Fine Aggregate	1,249.0 lbs
Cement--Type I	556.3 lbs
Fly Ash	113.8 lbs
Water	227.3 lbs
WRDA-64	26.3 Oz
ADVA	13.1 Oz

Design Strength (f'c): 5000 at 28 days

Placement Location and Notes:

Level P-3 columns at grids B/8, C/8, E.9/8, E/7, E/6, E/5, E/4, E.9/5 and the bottom portion of pile cap at grids A/4. Sampled at 8 of 18 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
9/24/2003	0015	0076	10/1/2003	7	67475	4 x 8	4.04	12.82	5260
9/24/2003	0015	0077	10/22/2003	28	87860	4 x 8	4.03	12.72	6910
9/24/2003	0015	0078	10/22/2003	28	85740	4 x 8	4.03	12.72	6740
9/24/2003	0015	0079	10/22/2003	28	86710	4 x 8	4.03	12.72	6810

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s):
D03-128
D03-129

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 54 °F
Weather: Clear
Product: Concrete
Supplier: Stoneway
Ticket Number : 351201
MixDesign ID : 5950-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
73 °F	5.5"	%

Water / Cement Ratio:	Date Received
0.339	9-25-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,963.0 lbs
Fine Aggregate	1,249.0 lbs
Cement--Type I	556.3 lbs
Fly Ash	113.8 lbs
Water	227.3 lbs
WRDA-64	26.3 Oz
ADVA	13.1 Oz

Design Strength (f'c): 5000 at 28 days

Placement Location and Notes:

Level P-3 columns at grids B/8, C/8, E.9/8, E/7, E/6, E/5, E/4, E.9/5 and the bottom portion of pile cap at grids A/4. Sampled at 8 of 18 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
9/24/2003	0015	0076	10/1/2003	7	67475	4 x 8	4.04	12.82	5260
9/24/2003	0015	0077	10/22/2003	28	87860	4 x 8	4.03	12.72	6910
9/24/2003	0015	0078	10/22/2003	28	85740	4 x 8	4.03	12.72	6740
9/24/2003	0015	0079	10/22/2003	28	86710	4 x 8	4.03	12.72	6810

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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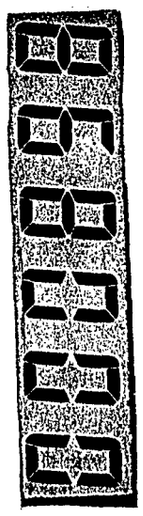

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s): D03-128

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 58 °F
Weather: Clear
Product: Concrete
Supplier: Stoneway
Ticket Number : 352131
MixDesign ID : 5950-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
74 °F	5.75"	%

Water / Cement Ratio:	Date Received
0.352	9-27-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,961.1 lbs
Fine Aggregate	1,248.0 lbs
Cement--Type I	551.8 lbs
Fly Ash	111.8 lbs
Water	233.4 lbs
WRDA-64	26.5 Oz
ADVA	13.1 Oz

Design Strength (f'c): 5000 at 28 days

Placement Location and Notes:

Level P-3 columns at grids B/3, B/4, B/5, B/6, B/7, C/2.8, D/2.8 and E/2.8. Sampled at 11 of 15 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
9/26/2003	0017	0084	10/3/2003	7	65825	4 x 8	4.02	12.72	5180
9/26/2003	0017	0085	10/24/2003	28	82040	4 x 8	4.02	12.67	6480
9/26/2003	0017	0086	10/24/2003	28	82530	4 x 8	4.02	12.67	6520
9/26/2003	0017	0087	10/24/2003	28	84410	4 x 8	4.02	12.67	6660

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s): D03-128

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 58 ° F
Weather: Clear
Product: Concrete
Supplier: Stoneway
Ticket Number : 352131
MixDesign ID : 5950-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
74 ° F	5.75"	%

Water / Cement Ratio: 0.352
Date Received: 9-27-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,961.1lbs
Fine Aggregate	1,248.0lbs
Cement--Type I	551.8 lbs
Fly Ash	111.8 lbs
Water	233.4 lbs
WRDA-64	26.5 Oz
ADVA	13.1 Oz

Design Strength (f'c): 5000 at 28 days

Placement Location and Notes:

Level P-3 columns at grids B/3, B/4, B/5, B/6, B/7, C/2.8, D/2.8 and E/2.8. Sampled at 11 of 15 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
9/26/2003	0017	0084	10/3/2003	7	65825	4 x 8	4.02	12.72	5180
9/26/2003	0017	0085	10/24/2003	28	82040	4 x 8	4.02	12.67	6480
9/26/2003	0017	0086	10/24/2003	28	82530	4 x 8	4.02	12.67	6520
9/26/2003	0017	0087	10/24/2003	28	84410	4 x 8	4.02	12.67	6660

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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CONCRETE LABORATORY TEST REPORT

Project : DHS Regional Headquarters
Client: Sabey Corporation
Contractor Sabey Construction

Project No: E3187
Issued on: 11-4-03
Original: ☑
Revised: ☐

Permit # (s): D03-128

FIELD DATA
(ASTM C31 and C172)

Air Temperature: 60 ° F
Weather: Mostly Clear
Product: Concrete
Supplier: Stoneway
Ticket Number : 360676
MixDesign ID : 5950-a

Sample Temp. (ASTM C1064)	Slump (ASTM C143)	Entrained Air (ASTM C231)
66 ° F	6.25"	%

Water / Cement Ratio:	Date Received
0.340	10-25-03

Actual Mix Proportions:

Ingredient	Weight (per cu.yd)
Coarse Aggregate 3/4"	1,961.5 lbs
Fine Aggregate	1,245.1 lbs
Cement--Type I	548.6 lbs
Fly Ash	110.0 lbs
Water	224.1 lbs
WRDA-64	26.6 Oz
ADVA	13.3 Oz

Design Strength (f'c): 5000 at 28 days

Placement Location and Notes:

Level P-3 columns at grids A/6 and A/7. Sampled at 7 of 7 cubic yards placed.

COMPRESSION TEST RESULTS
(ASTM C39 and C1231)

Date Made	Sample #	Lab #	Date Tested	Age (day)	Load (lbs)	Size (in)	Dia (in)	Surface Area	Strength (psi)
10/24/2003	0033	0148	10/31/2003	7	61365	4 x 8	4.02	12.69	4840
10/24/2003	0033	0149	11/21/2003	28		4 x 8			
10/24/2003	0033	0150	11/21/2003	28		4 x 8			
10/24/2003	0033	0151	11/21/2003	28		4 x 8			

Remark:

FC - Field Cure

Inspector(s): Mark McBride
Tested by: Mark McBride
Reviewed by:

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Portland Office
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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 64

Date: **10/23/03**
Weather: Partly cloudy
Inspection: Epoxy, lab, R/C

Permit #: **D03-128**

Performed laboratory duties to include retrieving test samples from the field cast on 10/22/03, testing samples scheduled to be tested on this date, logging test results and reports into the onsite computer database, introducing samples into water bath cure tanks and distributing preliminary concrete test reports to Sabey on site.

Observed the installation of #4 horizontal rebar dowels into Level P3 shear walls for the southwest exhaust shaft wall connections to shear walls. Holes were drilled for 6" embedment at 10" o.c. and cleaned with brush and compressed air prior to installing dowels using Hilti HIT HY-150 adhesive.

Performed final inspection of rebar prior to concrete placement of blast walls and Level P3 shear wall and pilasters on A-line from 4 to 5.5. Okay to place concrete. Contractor placed 73 cubic yards of Stoneway concrete mix #4356-a (4000 psi) by pump and mechanically consolidated. One sample of concrete was taken and four test cylinders were cast. Included in concrete placement are grade beams under permit #D03-129.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Portland Office
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Portland, OR 97211
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fax 503.281.7579

MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 65

Date: **10/23/03**
Weather: Partly cloudy
Inspection: R/C

Permit #: **D03-129**
Inspected rebar prior to concrete placement for grade beams on 3, 4 and 5 lines from A to B, C line from 4 to 5.4, and grade beam from grid points C/5.4 to B/5. After some clearance adjustments, rebar is placed per plan. Contractor placed Stoneway concrete mix #4356-a by pump and consolidated mechanically. Concrete was placed and sampled during placement under permit #D03-128.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: **Mark A. Galusha, P.E.**

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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EXHIBIT 53

MAYES ***TESTING ENGINEERS, INC.***

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 66

Date: **10/24/03**
Weather: Mostly clear
Inspection: Lab, R/C, R/S

Permit #: **D03-128**

Performed laboratory duties to include retrieving test samples from the field cast on 10/23/03, testing samples scheduled to be tested on this date, logging test results and reports into the onsite computer database, introducing samples into water bath cure tanks and distributing preliminary concrete test reports to Sabey on site.

Inspected rebar prior to closing forms for Level P3 southwest exhaust shaft walls. Rebar placed with #4s at 10" o.c. each way, centered. Okay to close forms. A final clearance inspection is required prior to placing concrete.

Performed final inspection of rebar prior to concrete placement for blast level P3 columns at grids A/6 and A/7. Contractor placed 7 cubic yards of Stoneway concrete mix #5950-1 (5000 psi) by crane and bucket and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: **Mark A. Galusha, P.E.**

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 67

Date: **10/24/03**
Weather: Mostly clear
Inspection: Epoxy

Permit #: **D03-129**
Observed installation of #9, 7, 6 and 5 horizontal rebar dowels into grade beams for the northwest exhaust shaft grade beams. Holes were drilled 18" for #9 bar, 11" for #7 bar, 9" for #6 bar, and 8" for #5 bar. Holes were cleaned with brush and compressed air prior to installing dowels using Hilti HIT HY-150 adhesive.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: **10/25/03**
Weather: Mostly clear
Inspection: Lab, R/C, R/S

Permit #: **D03-128**
Performed lab duties to include retrieving test samples from the field cast on 10/24/03, logging samples and reports into the onsite computer database and introducing samples into water bath cure tanks.

Performed final inspection of rebar prior to concrete placement for slab on grade between grids A and A.3 from 7.3 to 11, 7.3 and 8 from A to F and between D and F from 2 to 8, and Level P3 SW exhaust shaft walls. Rebar found placed per plan notes, details and revisions. Contractor placed 332 cubic yards of Stoneway concrete mix #4356-a (4000 psi) by pump and consolidated mechanically. Three samples of concrete were taken and four test cylinders were cast from each. Included in concrete placement is grade beams under permit #D03-129.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 68

Date: **10/25/03**
Weather: Mostly clear
Inspection: R/C

Permit #: **D03-129**
Inspected rebar prior to concrete placement for the NW exhaust shaft grade beams and grade beam on B-line from 3 to 4. Rebar is found placed per approved plans and revisions. Contractor placed Stoneway concrete mix #4356-a (3000 psi) by pump and consolidated mechanically. Concrete was placed with slab on grade and sampled during placement under permit #D03-128.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 69

Date: **10/27/03**
Weather: Mostly clear
Inspection: Lab, R/C

Permit #: **D03-128**

Performed lab duties to include retrieving test samples from the field that were cast on 10/25/03, testing samples scheduled to be tested this date, logging samples and reports into the onsite computer database, and introducing samples into water bath cure tanks.

Performed final inspection prior to placing concrete for slab on grade between grids A and D from 2 to 5.5. Rebar was found per plan notes and details. Contractor placement 186 cubic yards Stoneway concrete mix #4356-a (3000 psi) by pump and consolidated mechanically. Two samples of concrete were taken and four test cylinders were cast from each.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 60

Date: **10/17/03**
Weather: Partly Cloudy
Inspection: R/C, epoxy

Permit #: **D03-129**

Observed the installation of #7 and #9 horizontal rebar dowels into shear walls at grids D/7, 6 and 5.4 for grade beams on 6 and 7 lines from D to E, D-line from 4 to 5.4 and from 7 to 8 and angled grade beam from 5/E to 5.4/D. Holes were drilled for embedment depths according to fax transmittal from the engineer of record dated 10/16/03 and cleaned with brush and compressed air prior to installing dowels using Hilti HIT HY 150 adhesive.

Inspected rebar prior to placing concrete for grade beams on D-line from 4 to 5.4 and from 7 to 8, 6 and 7 lines from D to E and angled grade beam from E/5 to D/5.4. Rebar is placed per details C-2.1 and C-2.1A. Stoneway concrete mix #4356-a was placed and sampled during placement of walls under permit #D03-128.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: **10/18/03**
Weather: Cloudy
Inspection: Lab

Permit #: **D03-128**

Performed laboratory duties to include retrieving test samples from the field cast on 10/17/03, logging samples and reports into the onsite computer database and introducing samples into water bath cure tanks.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 61

Date: **10/20/03**
Weather: Rain
Inspection: Epoxy, lab

Permit #: **D03-128**

Performed laboratory duties to include testing samples scheduled to be tested on this date, logging test results and reports into the onsite computer database, and distributing preliminary concrete test reports to Sabey on site.

Observed the installation of #7 horizontal rebar dowels into shear wall at grids C/5.5 and 6.3 for blast wall connections to shear wall. Holes were drilled and cleaned previously for 8" embedment. Dowels were installed using Hilti HIT HY-150 adhesive according to the manufacturer's recommendations.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 59

Date: **10/17/03**
Weather: Partly Cloudy
Inspection: R/C, lab

Permit #: **D03-128**

Performed laboratory duties to include retrieving test samples from the field cast on 10/16/03, introducing samples into water bath cure tanks, testing samples scheduled to be tested on this date, logging test results and reports into the onsite computer database and distributing preliminary concrete test reports to Sabey on site.

Inspected rebar for a final inspection prior to placing concrete for level blast walls on 5.5 line from A to C and 7.3 line from A to B and 8" walls on 7.3 line from B to C and C-line from 7 to 7.3 – all from elevation 3'-0" to 0'-0". Rebar is found placed per plan detail and approved revisions. Okay to place concrete. Contractor placed (49) cubic yards of Stoneway concrete mix #4356-a, 4000psi requirement, at the above referenced locations (and grade beams under permit #D03-129) by pump and consolidated mechanically. One sample of concrete was taken and (4) test cylinders were cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 57

Date: **10/16/03**
Weather: Rain
Inspection: R/C, Lab

Permit #: **D03-128**

Performed laboratory duties to include testing samples scheduled to be tested on this date, logging test results and reports into the on site computer database and distributing preliminary concrete test reports to Sabey on site.

Inspected rebar for a final inspection prior to placing concrete for Level P-3 shear walls and pilasters on A-line from 7.2 to 11, 2-line from A to D.5, A-line from 2 to 3 and elevator pit walls for elevators 2, 3 and 5. Rebar is found placed per plan elevations, details and approved revisions. Okay to place concrete. Contractor placed (126) cubic yards of Stoneway concrete mix #4356-a, 4000psi requirement, at the above referenced locations by pump and consolidated mechanically. One sample of concrete was taken and (4) test cylinders were cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 56

Date: **10/15/03**
Weather: Rain
Inspection: R/S, epoxy, lab

Permit #: **D03-128** WR

Performed lab duties to include retrieving test samples from the field cast on 10/14/03, testing samples scheduled to be tested on this date, logging test results and reports into the onsite computer database, introducing samples into water bath cure tanks, and distributing preliminary concrete test reports to Sabey on site.

Observed the installation of #7 vertical rebar dowels into grade beam for shear wall on A-line between 8 and 9 per RFI #067. Holes were cleaned with brush and compressed air prior to installing dowels using Hilti HIT HY 150 adhesive.

Inspected rebar prior to closing forms for Level P3 shear walls and pilasters on A-line from 7.2 to 9, 2-line from A to D.5, and A-line from 2 to 3. Rebar is found placed per plan elevations and approved revisions. Okay to close forms. Slab on grade dowels and inside curtain dowels at the floor line will be installed after form closure. A final rebar and clearance inspection is required prior to placing concrete.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 55

Date: **10/14/03**
Weather: Overcast
Inspection: R/S, R/C

Permit #: **D03-128**
Transported and delivered project field reports and project concrete database disk for downloading to MTE main office and received lab equipment from the office and transported to site for use in onsite lab.

Inspected rebar prior to placing concrete for slab on grade between grids A and C from 5.5 to 7.3 (including thickened areas for blast walls) and slabs for elevators #2, 3 and 5 pits and for storage room P312. Rebar is found placed per approved plans and revisions. Contractor placed 127 cubic yards Stoneway concrete mix #4356-a (3000 psi required) at these locations by pump and consolidated mechanically. One sample was taken and four test cylinders were cast. Grade beams at grids 6 and 7 from A to C and on B from 5 to 8 were placed monolithically with slab.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: **10/14/03**
Weather: Overcast
Inspection: Lab, epoxy

Permit #: **D03-129**
Inspected rebar prior to concrete placement for grade beams on 6 and 7 lines from A to C and on B line from 5 to 8. Rebar is found placed per detail C/S2.1. Stoneway concrete mix #4356-a (3000 psi) was placed by pump and consolidated mechanically. Concrete was sampled and placed monolithically with slab on grade under Permit #D03-128.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 53

Date: **10/13/03**
Weather: Cloudy
Inspection: R/S

Permit #: **D03-128**
Inspected rebar prior to closing forms for Level P3 wall and pilasters on A-line from 9 to 11. Rebar is placed per structural plan details and elevations and Harris Rebar release package 2304A rev.0. Okay to close forms. Slab on grade dowels and inside curtain dowels at the floor line will be installed after form closure. A final rebar and clearance inspection is required prior to concrete placement.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: **10/13/03**
Weather: Cloudy
Inspection: Lab, epoxy

Permit #: **D03-129**
Performed laboratory duties to include testing samples that are scheduled to be tested on this date, logging test results and reports into the onsite computer database, distributing preliminary test reports to Sabey on site, and disposing of tested samples.

Observed the installation of #10 vertical rebar dowels into pile caps for pilasters at grids A/3, 5, 8 (three at each location). Dowels were installed per RFI #062. Holes were cleaned with brush and compressed air prior to installing dowels using Hilti HIT HY-150 adhesive.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 47

Date: **10/08/03**
Weather: Occasional rain
Inspection: Lab, R/S, epoxy

Permit #: **D03-128**
Performed laboratory duties to include testing samples scheduled to be tested on this date, logging test results and reports into the onsite computer database.

Inspected rebar prior to closing forms for Level P3 shear walls and pilasters on 2-line from C.5-E.9 and on A-line from 9 to 11. Okay to close forms. Slab on grade dowels and inside curtain dowels at the floor level will be installed after form closure. A final rebar and clearance inspection is required prior to placing concrete.

Inspected rebar prior to closing forms and placing concrete for below-grade portion of shear wall and pilasters on A-line from approximate grids 5.3 and 7.7. Okay to close forms and place concrete. Contractor placed approximately 10 cubic yards of Stoneway concrete mix #4356-a (4000 psi requirement) by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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EXHIBIT 5

MAYES ***TESTING ENGINEERS, INC.***

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Portland Office
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Suite 190
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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 48

Date: **10/08/03**
Weather: Occasional rain
Inspection: Lab, R/S, epoxy

Permit #: **D03-129**
Inspected rebar prior to placing concrete for grade beams on 8-line from E to E.9 and on E-line from 4 to 6 and from 7 to 8. Rebar is placed per detail C/S2.1. Contractor placed approximately 21 cubic yards of Stoneway concrete mix #4356-1 by pump and consolidated mechanically. Concrete was sampled and test cylinders were cast during placement of this mix under permit #D03-128.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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EXHIBIT 69

MAYES ***TESTING ENGINEERS, INC.***

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 49

Date: **10/09/03**
Weather: Occasional rain
Inspection: R/S, R/C

Permit #: **D03-128**
Performed final inspection of rebar prior to concrete placement for Level P3 shear walls and pilasters on E.9 and F lines from 2 to 6.8 and on 2-line from D.5 to E.9. Contractor placed 93 cubic yards Stoneway concrete mix #4356-a (4000 psi requirement) at these locations by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

Inspected rebar for slab on grade between grids A.2-E.9/F from 9 to 11, and between B and F from 8 to 9. Rebar is found placed per plan S1.1 and detail H/S2.3. The ½" diameter plain dowels at construction joints still need to be installed and greased per detail on S2.3. A final inspection is required prior to placing concrete.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 50

Date: **10/09/03**
Weather: Occasional rain
Inspection: Lab, epoxy

Permit #: **D03-129**
Performed laboratory duties to include retrieving test samples from the field cast on 10/8/03 and logging samples and reports into the onsite computer database.

Observed the installation of #9, #7 and #5 horizontal rebar dowels into grade beams for the added grade beams at the southwest exhaust shaft. Holes were drilled for embedment depths per the engineer's sketches dated 9/30/03 and cleaned with brush and compressed air prior to installing dowels using Hilti Hit HY-150 adhesive.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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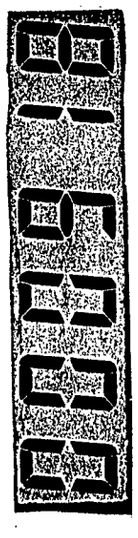

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Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 51

Date: **10/10/03**
Weather: Partly cloudy
Inspection: R/C, lab

Permit #: **D03-128**
Inspected rebar for a final inspection prior to placing concrete for slab on grade between grids A.2 to E.9/F from 9 to 11, and between B and F from 8 to 9. Rebar is found placed per plan S1.1 and details H/S2.3. The ½" diameter plain dowels at construction joints are installed and greased per detail on S2.3. Contractor placed 257 cubic yards of Stoneway concrete mix #4356-a (3000 psi requirement) by pump and consolidated mechanically. Two samples of concrete were taken and four test cylinders were cast from each.

Performed laboratory duties to include retrieving test samples from the field cast on 10/9/03 and testing samples that were scheduled to be tested on this date. Logged test results and reports into onsite computer database and distributed test results to Sabey on site and disposed of tested concrete cylinders.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 52

Date: **10/10/03**
Weather: Partly cloudy
Inspection: R/C

Permit #: **D03-129**
Inspected rebar prior to concrete placement for added grade beams for the southwest exhaust shaft and for grade beam on C line from 9 to 10. Rebar is found to be per approved plans and revisions. Stoneway concrete mix #4356-1 (3000 psi) was placed by pump and mechanically consolidated. Concrete was placed, sampled and tested during slab on grade placement under permit #D03-128.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: **10/11/03**
Weather: Cloudy
Inspection: Lab

Permit #: **D03-128**
Performed laboratory duties to include retrieving test samples from the field cast on 10/10/03, logging samples and reports into the onsite computer database, and introducing samples into water bath cure tanks.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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MTE No.: **E3187**
Project: **DHS REGIONAL HEADQUARTERS**
Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)** JD

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 40

Date: **9/30/03**
Weather: Mostly cloudy
Inspection: Lab, rebar

Performed laboratory duties to include retrieving test samples from the field cast on 9/29/03, logging samples and reports into the onsite computer database, and introducing samples into water bath cure tanks.

Inspected rebar prior to form closure of Level P3 shear walls on grid 11/A-D. Rebar is placed per elevation on S5.1. Okay to begin form closure. A final inspection of slab dowels and clearances is required prior to placing concrete. Inside curtain dowels at the floor line will be installed and inspected after form closure from the top.

Inspected re-steel for a final inspection for Level P3 perimeter walls on E.9 and F lines from 6.8 to 11, and on 11 line from E.8 to E.9. Re-steel is found placed per plan elevations, details and approved revisions. Okay to place concrete scheduled for 10/1/03.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

Date: **10/01/03**
Weather: Mostly cloudy
Inspection: Lab, R/C

Performed laboratory duties to include testing samples scheduled to be tested on this date and logging test results and reports into the onsite computer database.

Monitored the placement of 80 cubic yards of Stoneway concrete mix #4356-a (4000 psi requirement) at Level P3 shear walls and pilasters on E.9 and F lines from 6.8 to 11, and on 11 line from E.8 to E.9, and grade beams on E line from 9 to 11, 10.2 line from C to D, D line from 9

Continued on page 41

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction

Continued from page 40

to 11, and angled grade beam from grids 10.2E to 10/E.9. Concrete was placed by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast. Re-steel was inspected prior to placing concrete for grade beams and found to be per details C-2.1 and C-2.1A. Walls and pilasters previously approved for placement. Please note that 4000-psi concrete had been approved by the engineer of record for placement of columns with perimeter walls (pilasters) up to the grade where walls terminate and columns continue. However, it was noted weeks prior that the lap lengths of column dowels from the pile caps are detailed and fabricated to meet the required lap using 5000 psi concrete (71"). The lap length using 4000 psi concrete is 79". This was discussed with Rich, Sabey superintendent, when noted. Rich stated that 5000 psi concrete would be used to accommodate the lap splice lengths of the pilaster dowels. Sabey's subcontractor, GBC, states that it was not conveyed to them about the use of 5000 psi concrete. The engineer of record should review the lap provided of pilaster dowels and the strength of the concrete used.

Inspected rebar prior to placing concrete for grade beam and top portion of pile caps on A line from 2 to 11. Rebar is placed per plans (please note that dowels for retaining wall footings are intentionally left out, and the contractor will seek epoxy doweling approval from the engineer of record when the time comes to form and place these retaining wall footings). Contractor placed 86 cubic yards of Stoneway concrete mix #4356 (3000 psi requirement) by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast. Please note that the #10 column dowels partially cast in the lower portions of pile caps at grids A/3, 5, 6, 7, 8 and 10 have been bent to an angle in order to get the dowels within columns due to misplaced template when placing the lower portions of pile caps. The bars will then be bent back straight prior to placing rebar cages for Level P3 columns. The cold field bending of #10 bars should be reviewed by the engineer of record. This was discussed with Doug, Sabey assistant superintendent.

Preliminary inspection

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 42

Date: **10/02/03**
Weather: Overcast
Inspection: Lab

Performed laboratory duties to include testing samples scheduled to be tested on this date retrieving test samples from the field cast on 10/1/03, logging samples, test results and reports into the onsite computer database and introducing samples into water bath cure tanks.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride.

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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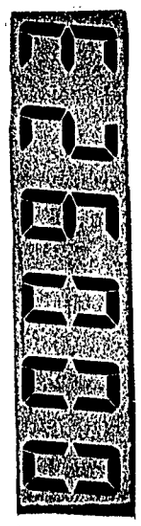

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 43

Date: **10/03/03**
Weather: Partly cloudy
Inspection: Lab, R/C

Performed laboratory duties to include testing samples scheduled to be tested on this date and logging test results and reports into the onsite computer database.

Inspected rebar for a final inspection prior to concrete placement at the following locations:

- Level P3 main elevator core shear walls
- Grade beams on 9-line from A to B and D to E.9; 10 line from A to B; 10.2 line from C to D; 4 line from B to C and D to E.9; 2.8 line from C to E; B line from 2 to 3 and 9 to 11; C line from 2 to 4 and 10.2 to 11; D line from 2 to 4; and E line from 2 to 4
- Angled grade beams from grid points 10/B to 10.2/C, 2.8/E to 3/E.9 and 2.8/C to 3/B

After several clearance adjustments, okay to place concrete. Please note that all walls and grade beams stemming from the main elevator core shear walls will have the rebar dowels drilled and epoxied. Contractor placed 201 cubic yards Stoneway concrete mix #4356-a (4000 psi required) at above locations by pump and consolidated mechanically. Two samples of concrete were taken and four test cylinders were cast from each.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: **Mark A. Galusha, P.E.**

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Address: 12500 Tukwila International Blvd, Tukwila, WA
Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 44

Date: **10/04/03**
Weather: Cloudy
Inspection: Lab

Performed laboratory duties to include retrieving test cylinders from the field cast on 10/3/03, logging samples and reports into the onsite computer database and introducing samples into water bath cure tanks.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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Permit #: **D03-128 / D03-129 (City of Tukwila)**

Owner: Sabey Corporation
Architect: Lance Mueller and Associates
Engineer: Engineers Northwest, Inc.
Contractor: Sabey Construction
Page 45

Date: **10/06/03**
Weather: Cloudy
Inspection: Lab, R/C

Performed laboratory duties to include testing samples scheduled to be tested on this date, logging test results and reports into the onsite computer database and disposing of tested concrete cylinders.

Inspected rebar for a final inspection prior to placing concrete at the following locations:

- Level P3 shear wall and pilasters on 11-line from A to E.8
- Grade beams on 8-line from B to E
- Grade beams on B, C, D and E lines from 8 to 9
- Grade beams on 5, 6 and 7 lines from E to F

After some clearance adjustments, all was found to be per approved plan details and revisions. Contractor placed 115 cubic yards of Stoneway concrete mix #4356-1 (4000 psi requirement) at above referenced locations by pump and consolidated mechanically. One sample of concrete was taken and four test cylinders were cast.

Please note that preliminary items noted in MTE field report dated 10/1/03 requiring review by the engineer of record have been addressed and a response has been issued in RFI #061 and #062.

To the best of our knowledge, items inspected this date are in accordance with approved plans and specifications.

INSPECTOR: Mark McBride

REVIEWED BY: _____
Mark A. Galusha, P.E.

cc: Bldg Dept-City of Tukwila, Ralph Hagler-Sabey Corporation, Bob Fadden-Lance Mueller & Associates, Theodore McDonald-Engineers Northwest, Dave Leng-Sabey Construction, Bob Brott-Art Anderson Assoc., Inc.

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PACE CONSULTING GROUP
5005 3RD. AVENUE SOUTH
SEATTLE, WA 98134

PROJECT: Sabey Bldg 9 DHS
CLIENT: MCK
DATE: 04/09/03

FULL COMMERCIAL HVAC LOADS PROGRAM

DESIGNER: CW

BUILDING MASTER DATA AND DESIGN PARAMETERS:

DESIGN MONTH	OUTDOOR DRY BULB	OUTDOOR WET BULB	INDOOR REL.HUM	INDOOR DRY BULB	GRAINS DIFF.	IN/OUTDOOR CORRECTION
JANUARY	50	47	45%	75	-15.21	-43
MARCH	61	49	45%	75	-25.74	-32
JULY	82	66	45%	75	11.89	-11
WINTER	24	0	50%	70	0.00	

ROOF TYPE	ASHRAE ROOF #	ROOF U-FAC	ROOF COLOR	SUSP CLG.
1.	5	0.050	LIGHT	YES

PART TYPE	PART U-FAC	COOL T-D	HEAT T-D
1.	0.056	10	46

WALL TYPE	ASHRAE GROUP	WALL U-FAC	WALL COLOR
1.	G	0.140	DARK
2.	G	0.600	DARK

GLASS NO.	SUMMER U-FAC.	WINTER U-FAC.	GLASS SHD.COEF	INTERIOR SHADING	INTERIOR SHD.COEF	ROOM CONST	GLASS WIDTH	GLASS HEIGHT
1.	0.500	0.500	0.450	NO	0.000	LIGHT	1.00	6.00
2.	0.500	0.500	0.450	NO	0.000	LIGHT	1.00	9.00

GENERAL PROJECT INFORMATION:

PROJECT FILE NAME:	C:DHS4
PROJECT LOCATION:	SEATTLE, WA
BAROMETRIC PRESSURE:	29.900 IN.HG
ALTITUDE:	19 FEET
NORTH LATITUDE:	47 DEGREES
MEAN DAILY TEMPERATURE RANGE:	22 DEG.F
ATMOSPHERIC CLEARNESS FACTOR:	1.00
GROUND REFLECTANCE:	20 PERCENT
STARTING TIME FOR HVAC LOAD CALCULATIONS:	8 AM
ENDING TIME FOR HVAC LOAD CALCULATIONS:	8 PM
FLOOR HEAT LOSS COEFFICIENT:	0.81 BTUH/FT-F

FILE COPY

I understand that the Plan Check is subject to errors and omissions.

RECEIVED
CITY OF TUKWILA
APR 30 2003
PERMIT CENTER

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D03-128

EXHIBIT 5

NUMBER OF UNIQUE ZONES IN THIS PROJECT: 117

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

0 5 0 5 5 0

********** GENERAL PROJECT DATA (CONTINUED) **********

BUILDING DEFAULT VALUES:

CALCULATIONS PERFORMED:	BOTH HEATING AND COOLING LOADS
LIGHTING REQUIREMENTS:	1.20 WATTS PER SQUARE FOOT
EQUIPMENT REQUIREMENTS:	1.50 WATTS PER SQUARE FOOT
PEOPLE SENSIBLE LOAD MULTIPLIER:	250 BTUHS PER PERSON
PEOPLE LATENT LOAD MULTIPLIER:	200 BTUHS PER PERSON
PEOPLE OCCUPANCY BASIS:	1 PERSON PER 143 SQ.FT
ZONE SENSIBLE SAFETY FACTOR:	0%
ZONE LATENT SAFETY FACTOR:	0%
ZONE HEATING SAFETY FACTOR:	20%
PEOPLE DIVERSITY FACTOR:	100%
LIGHTING PROFILE NUMBER:	1
EQUIPMENT PROFILE NUMBER:	1
PEOPLE PROFILE NUMBER:	1
BUILDING DEFAULT CLG. HEIGHT:	13.00 FEET
BUILDING DEFAULT WALL HEIGHT:	13.00 FEET

INTERNAL OPERATING LOAD PROFILES (C=100):

REF NO.	HR 1	HR 2	HR 3	HR 4	HR 5	HR 6	HR 7	HR 8	HR 9	HR 10	HR 11	HR 12	HR 13	HR 14	HR 15	HR 16	HR 17	HR 18	HR 19	HR 20	HR 21	HR 22	HR 23	HR 24
1.	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	C	C	0	0	0	0
2.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
4.	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
5.	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
6.	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
7.	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
8.	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
9.	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
10.	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

ALL DESIGN DATA TAKEN FROM THE 1989 ASHRAE HANDBOOK OF FUNDAMENTALS

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

********** AIR HANDLER INPUT DATA **********

AIR HANDLER # 1 INPUT DATA:

AIR HANDLER DESCRIPTION:	AC1 South unit
TERMINAL TYPE:	VARIABLE AIR VOLUME
METHOD FOR CV:	SUM PEAK ZONE CFMS
SUPPLY FAN TYPE:	DRAW-THRU
CALCULATIONS PERFORMED:	BOTH HEATING AND COOLING LOADS
EXCESS SUPPLY AIR:	RESERVE CAPACITY
NUMBER OF TIMES SYSTEM OCCURS:	1
LIGHTING PROFILE NUMBER:	1
EQUIPMENT PROFILE NUMBER:	1
PEOPLE PROFILE NUMBER:	1
EXHAUST CAN EXCEED SUPPLY AIR:	NO
LEAVING HEATING COIL TEMP. (DEG.F):	95
DRY BULB TEMPERATURE (DEG.F):	52
COOLING COIL CFM:	0
MISC. BTUH GAIN - SUPPLY SIDE:	0
MISC. BTUH GAIN - RETURN SIDE:	0
COMBINED FAN,MOTOR EFFICIENCY (%):	60
STATIC PRESS. ACROSS FAN (IN.WG):	4.500
SUMMER SUPPLY DUCT TEMP. RISE (DEG.F):	0.000
SUMMER RETURN DUCT TEMP. RISE (DEG.F):	0.000
WINTER SUPPLY DUCT TEMP. DROP (DEG.F):	0.000
WINTER RETURN DUCT TEMP. DROP (DEG.F):	0.000
CHILLED WATER TEMP.DIFFERENCE (DEG.F):	0.000
HOT WATER TEMP.DIFFERENCE (DEG.F):	0.000
COOLING VENTILATION METHOD:	2
COOLING VENTILATION VALUE:	20.000 CFM PER PERSON
COOLING INFILTRATION METHOD:	0
COOLING INFILTRATION VALUE:	0.000
HEATING VENTILATION METHOD:	2
HEATING VENTILATION VALUE:	20.000 CFM PER PERSON
HEATING INFILTRATION METHOD:	1
HEATING INFILTRATION VALUE:	1.500 AIR CHANGES PER HOUR
VENTILATION IS 100% OF SUPPLY AIR:	NO
PRETREATED OUTSIDE AIR:	NO
IGNORE PRETREATED LOAD:	NO
PRETREATED AIR SUMMER DB TEMP (DEG.F):	0
PRETREATED AIR SUMMER WB TEMP (DEG.F):	0
PRETREATED AIR WINTER DB TEMP (DEG.F):	0

DESIGN MONTH	OUTDOOR DRY BULB	OUTDOOR WET BULB	INDOOR REL.HUM	INDOOR DRY BULB	GRAINS DIFF.	IN/OUTDOOR CORRECTION
JANUARY	50	47	45%	75	-15.21	-43
MARCH	61	49	45%	75	-25.74	-32
JULY	82	66	45%	75	11.89	-11
WINTER	24	0	50%	70	0.00	

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

********** AIR HANDLER INPUT DATA **********

AIR HANDLER # 2 INPUT DATA:

AIR HANDLER DESCRIPTION:	AC2 North unit
TERMINAL TYPE:	VARIABLE AIR VOLUME
METHOD FOR CV:	SUM PEAK ZONE CFMS
SUPPLY FAN TYPE:	DRAW-THRU
CALCULATIONS PERFORMED:	BOTH HEATING AND COOLING LOADS
EXCESS SUPPLY AIR:	RESERVE CAPACITY
NUMBER OF TIMES SYSTEM OCCURS:	1
LIGHTING PROFILE NUMBER:	1
EQUIPMENT PROFILE NUMBER:	1
PEOPLE PROFILE NUMBER:	1
EXHAUST CAN EXCEED SUPPLY AIR:	NO
LEAVING HEATING COIL TEMP. (DEG.F):	95
DRY BULB TEMPERATURE (DEG.F):	52
COOLING COIL CFM:	0
MISC. BTUH GAIN - SUPPLY SIDE:	0
MISC. BTUH GAIN - RETURN SIDE:	0
COMBINED FAN,MOTOR EFFICIENCY (%):	60
STATIC PRESS. ACROSS FAN (IN.WG):	4.500
SUMMER SUPPLY DUCT TEMP. RISE (DEG.F):	0.000
SUMMER RETURN DUCT TEMP. RISE (DEG.F):	0.000
WINTER SUPPLY DUCT TEMP. DROP (DEG.F):	0.000
WINTER RETURN DUCT TEMP. DROP (DEG.F):	0.000
CHILLED WATER TEMP.DIFFERENCE (DEG.F):	0.000
HOT WATER TEMP.DIFFERENCE (DEG.F):	0.000
COOLING VENTILATION METHOD:	2
COOLING VENTILATION VALUE:	20.000 CFM PER PERSON
COOLING INFILTRATION METHOD:	0
COOLING INFILTRATION VALUE:	0.000
HEATING VENTILATION METHOD:	2
HEATING VENTILATION VALUE:	20.000 CFM PER PERSON
HEATING INFILTRATION METHOD:	1
HEATING INFILTRATION VALUE:	1.500 AIR CHANGES PER HOUR
VENTILATION IS 100% OF SUPPLY AIR:	NO
PRETREATED OUTSIDE AIR:	NO
IGNORE PRETREATED LOAD:	NO
PRETREATED AIR SUMMER DB TEMP (DEG.F):	0
PRETREATED AIR SUMMER WB TEMP (DEG.F):	0
PRETREATED AIR WINTER DB TEMP (DEG.F):	0

DESIGN MONTH	OUTDOOR DRY BULB	OUTDOOR WET BULB	INDOOR REL.HUM	INDOOR DRY BULB	GRAINS DIFF.	IN/OUTDOOR CORRECTION
JANUARY	50	47	45%	75	-15.21	-43
MARCH	61	49	45%	75	-25.74	-32
JULY	82	66	45%	75	11.89	-11
WINTER	24	0	50%	70	0.00	

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

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********** AIR HANDLER INPUT DATA **********

AIR HANDLER # 3 INPUT DATA:

AIR HANDLER DESCRIPTION:	AC3 1st flr detention	
TERMINAL TYPE:	VARIABLE AIR VOLUME	
METHOD FOR CV:	SUM PEAK ZONE CFMS	
SUPPLY FAN TYPE:	DRAW-THRU	
CALCULATIONS PERFORMED:	BOTH HEATING AND COOLING LOADS	
EXCESS SUPPLY AIR:	RESERVE CAPACITY	
NUMBER OF TIMES SYSTEM OCCURS:	1	
LIGHTING PROFILE NUMBER:	1	
EQUIPMENT PROFILE NUMBER:	1	
PEOPLE PROFILE NUMBER:	1	
EXHAUST CAN EXCEED SUPPLY AIR:	NO	
LEAVING HEATING COIL TEMP. (DEG.F):	95	
DRY BULB TEMPERATURE (DEG.F):	52	
COOLING COIL CFM:	0	
MISC. BTUH GAIN - SUPPLY SIDE:	0	
MISC. BTUH GAIN - RETURN SIDE:	0	
COMBINED FAN,MOTOR EFFICIENCY (%):	60	
STATIC PRESS. ACROSS FAN (IN.WG):	4.500	
SUMMER SUPPLY DUCT TEMP. RISE (DEG.F):	0.000	
SUMMER RETURN DUCT TEMP. RISE (DEG.F):	0.000	
WINTER SUPPLY DUCT TEMP. DROP (DEG.F):	0.000	
WINTER RETURN DUCT TEMP. DROP (DEG.F):	0.000	
CHILLED WATER TEMP.DIFFERENCE (DEG.F):	0.000	
HOT WATER TEMP.DIFFERENCE (DEG.F):	0.000	
COOLING VENTILATION METHOD:	2	
COOLING VENTILATION VALUE:	20.000	CFM PER PERSON
COOLING INFILTRATION METHOD:	0	
COOLING INFILTRATION VALUE:	0.000	
HEATING VENTILATION METHOD:	2	
HEATING VENTILATION VALUE:	20.000	CFM PER PERSON
HEATING INFILTRATION METHOD:	1	
HEATING INFILTRATION VALUE:	1.500	AIR CHANGES PER HOUR
VENTILATION IS 100% OF SUPPLY AIR:	NO	
PRETREATED OUTSIDE AIR:	NO	
IGNORE PRETREATED LOAD:	NO	
PRETREATED AIR SUMMER DB TEMP (DEG.F):	0	
PRETREATED AIR SUMMER WB TEMP (DEG.F):	0	
PRETREATED AIR WINTER DB TEMP (DEG.F):	0	

DESIGN MONTH	OUTDOOR DRY BULB	OUTDOOR WET BULB	INDOOR REL.HUM	INDOOR DRY BULB	GRAINS DIFF.	IN/OUTDOOR CORRECTION
JANUARY	50	47	45%	75	-15.21	-43
MARCH	61	49	45%	75	-25.74	-32
JULY	82	66	45%	75	11.89	-11
WINTER	24	0	50%	70	0.00	

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********** AIR HANDLER INPUT DATA **********

AIR HANDLER # 4 INPUT DATA:

AIR HANDLER DESCRIPTION:	AC2 2 flr north expansion
TERMINAL TYPE:	VARIABLE AIR VOLUME
METHOD FOR CV:	SUM PEAK ZONE CFMS
SUPPLY FAN TYPE:	DRAW-THRU
CALCULATIONS PERFORMED:	BOTH HEATING AND COOLING LOADS
EXCESS SUPPLY AIR:	RESERVE CAPACITY
NUMBER OF TIMES SYSTEM OCCURS:	1
LIGHTING PROFILE NUMBER:	1
EQUIPMENT PROFILE NUMBER:	1
PEOPLE PROFILE NUMBER:	1
EXHAUST CAN EXCEED SUPPLY AIR:	NO
LEAVING HEATING COIL TEMP. (DEG.F):	95
DRY BULB TEMPERATURE (DEG.F):	52
COOLING COIL CFM:	0
MISC. BTUH GAIN - SUPPLY SIDE:	0
MISC. BTUH GAIN - RETURN SIDE:	0
COMBINED FAN,MOTOR EFFICIENCY (%):	60
STATIC PRESS. ACROSS FAN (IN.WG):	4.500
SUMMER SUPPLY DUCT TEMP. RISE (DEG.F):	0.000
SUMMER RETURN DUCT TEMP. RISE (DEG.F):	0.000
WINTER SUPPLY DUCT TEMP. DROP (DEG.F):	0.000
WINTER RETURN DUCT TEMP. DROP (DEG.F):	0.000
CHILLED WATER TEMP.DIFFERENCE (DEG.F):	0.000
HOT WATER TEMP.DIFFERENCE (DEG.F):	0.000
COOLING VENTILATION METHOD:	2
COOLING VENTILATION VALUE:	20.000 CFM PER PERSON
COOLING INFILTRATION METHOD:	0
COOLING INFILTRATION VALUE:	0.000
HEATING VENTILATION METHOD:	2
HEATING VENTILATION VALUE:	20.000 CFM PER PERSON
HEATING INFILTRATION METHOD:	1
HEATING INFILTRATION VALUE:	1.500 AIR CHANGES PER HOUR
VENTILATION IS 100% OF SUPPLY AIR:	NO
PRETREATED OUTSIDE AIR:	NO
IGNORE PRETREATED LOAD:	NO
PRETREATED AIR SUMMER DB TEMP (DEG.F):	0
PRETREATED AIR SUMMER WB TEMP (DEG.F):	0
PRETREATED AIR WINTER DB TEMP (DEG.F):	0

DESIGN MONTH	OUTDOOR DRY BULB	OUTDOOR WET BULB	INDOOR REL.HUM	INDOOR DRY BULB	GRAINS DIFF.	IN/OUTDOOR CORRECTION
JANUARY	50	47	45%	75	-15.21	-43
MARCH	61	49	45%	75	-25.74	-32
JULY	82	66	45%	75	11.89	-11
WINTER	24	0	50%	70	0.00	

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********** AIR HANDLER INPUT DATA **********

AIR HANDLER # 5 INPUT DATA:

AIR HANDLER DESCRIPTION:	AC2 4 flr north expansion	
TERMINAL TYPE:	VARIABLE AIR VOLUME	
METHOD FOR CV:	SUM PEAK ZONE CFMS	
SUPPLY FAN TYPE:	DRAW-THRU	
CALCULATIONS PERFORMED:	BOTH HEATING AND COOLING LOADS	
EXCESS SUPPLY AIR:	RESERVE CAPACITY	
NUMBER OF TIMES SYSTEM OCCURS:	1	
LIGHTING PROFILE NUMBER:	1	
EQUIPMENT PROFILE NUMBER:	1	
PEOPLE PROFILE NUMBER:	1	
EXHAUST CAN EXCEED SUPPLY AIR:	NO	
LEAVING HEATING COIL TEMP. (DEG.F):	95	
DRY BULB TEMPERATURE (DEG.F):	52	
COOLING COIL CFM:	0	
MISC. BTUH GAIN - SUPPLY SIDE:	0	
MISC. BTUH GAIN - RETURN SIDE:	0	
COMBINED FAN,MOTOR EFFICIENCY (%):	60	
STATIC PRESS. ACROSS FAN (IN.WG):	4.500	
SUMMER SUPPLY DUCT TEMP. RISE (DEG.F):	0.000	
SUMMER RETURN DUCT TEMP. RISE (DEG.F):	0.000	
WINTER SUPPLY DUCT TEMP. DROP (DEG.F):	0.000	
WINTER RETURN DUCT TEMP. DROP (DEG.F):	0.000	
CHILLED WATER TEMP.DIFFERENCE (DEG.F):	0.000	
HOT WATER TEMP.DIFFERENCE (DEG.F):	0.000	
COOLING VENTILATION METHOD:	2	
COOLING VENTILATION VALUE:	20.000	CFM PER PERSON
COOLING INFILTRATION METHOD:	0	
COOLING INFILTRATION VALUE:	0.000	
HEATING VENTILATION METHOD:	2	
HEATING VENTILATION VALUE:	20.000	CFM PER PERSON
HEATING INFILTRATION METHOD:	1	
HEATING INFILTRATION VALUE:	1.500	AIR CHANGES PER HOUR
VENTILATION IS 100% OF SUPPLY AIR:	NO	
PRETREATED OUTSIDE AIR:	NO	
IGNORE PRETREATED LOAD:	NO	
PRETREATED AIR SUMMER DB TEMP (DEG.F):	0	
PRETREATED AIR SUMMER WB TEMP (DEG.F):	0	
PRETREATED AIR WINTER DB TEMP (DEG.F):	0	

DESIGN MONTH	OUTDOOR DRY BULB	OUTDOOR WET BULB	INDOOR REL.HUM	INDOOR DRY BULB	GRAINS DIFF.	IN/OUTDOOR CORRECTION
JANUARY	50	47	45%	75	-15.21	-43
MARCH	61	49	45%	75	-25.74	-32
JULY	82	66	45%	75	11.89	-11
WINTER	24	0	50%	70	0.00	

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DEPARTMENT OF ECOLOGY

********** AIR HANDLER INPUT DATA **********

AIR HANDLER # 6 INPUT DATA:

AIR HANDLER DESCRIPTION:	AC4 Elev Penthouse	
TERMINAL TYPE:	VARIABLE AIR VOLUME	
METHOD FOR CV:	SUM PEAK ZONE CFMS	
SUPPLY FAN TYPE:	DRAW-THRU	
CALCULATIONS PERFORMED:	BOTH HEATING AND COOLING LOADS	
EXCESS SUPPLY AIR:	RESERVE CAPACITY	
NUMBER OF TIMES SYSTEM OCCURS:	1	
LIGHTING PROFILE NUMBER:	1	
EQUIPMENT PROFILE NUMBER:	1	
PEOPLE PROFILE NUMBER:	1	
EXHAUST CAN EXCEED SUPPLY AIR:	NO	
LEAVING HEATING COIL TEMP. (DEG.F):	95	
DRY BULB TEMPERATURE (DEG.F):	55	
COOLING COIL CFM:	0	
MISC. BTUH GAIN - SUPPLY SIDE:	0	
MISC. BTUH GAIN - RETURN SIDE:	0	
COMBINED FAN,MOTOR EFFICIENCY (%):	60	
STATIC PRESS. ACROSS FAN (IN.WG):	4.500	
SUMMER SUPPLY DUCT TEMP. RISE (DEG.F):	0.000	
SUMMER RETURN DUCT TEMP. RISE (DEG.F):	0.000	
WINTER SUPPLY DUCT TEMP. DROP (DEG.F):	0.000	
WINTER RETURN DUCT TEMP. DROP (DEG.F):	0.000	
CHILLED WATER TEMP.DIFFERENCE (DEG.F):	0.000	
HOT WATER TEMP.DIFFERENCE (DEG.F):	0.000	
COOLING VENTILATION METHOD:	2	
COOLING VENTILATION VALUE:	20.000	CFM PER PERSON
COOLING INFILTRATION METHOD:	0	
COOLING INFILTRATION VALUE:	0.000	
HEATING VENTILATION METHOD:	2	
HEATING VENTILATION VALUE:	20.000	CFM PER PERSON
HEATING INFILTRATION METHOD:	1	
HEATING INFILTRATION VALUE:	0.500	AIR CHANGES PER HOUR
VENTILATION IS 100% OF SUPPLY AIR:	NO	
PRETREATED OUTSIDE AIR:	NO	
IGNORE PRETREATED LOAD:	NO	
PRETREATED AIR SUMMER DB TEMP (DEG.F):	0	
PRETREATED AIR SUMMER WB TEMP (DEG.F):	0	
PRETREATED AIR WINTER DB TEMP (DEG.F):	0	

DESIGN MONTH	OUTDOOR DRY BULB	OUTDOOR WET BULB	INDOOR REL.HUM	INDOOR DRY BULB	GRAINS DIFF.	IN/OUTDOOR CORRECTION
JANUARY	50	47	45%	85	-38.11	-53
MARCH	61	49	45%	85	-48.64	-42
JULY	82	66	45%	85	-11.01	-21
WINTER	24	0	50%	70	0.00	

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

********** AIR SYSTEM # 1 (AC1 South unit) ZONE SUMMARY **********

ZN. NO.	ZONE - DESCRIPTION PEAK TIME & MONTH	FLOOR AREA	HTG.LOSS O.A. CFM	SEN.GAIN O.A. CFM	LAT.GAIN EXH. CFM	HTG.CFM CFM/SF.	CLG.CFM CFM/SF.
1	1E ENTRY	324	16,229	17,239	453	601	773
	10 AM JULY		45	45	0	1.85	2.39
2	1 E2	756	36,626	34,290	1,057	1,357	1,538
	10 AM JULY		106	106	0	1.79	2.03
3	1 E3	552	25,810	25,311	772	957	1,136
	10 AM JULY		77	77	0	1.73	2.06
4	1SE	144	11,810	10,717	201	438	481
	1 PM JULY		20	20	0	3.04	3.34
5	1S1	372	17,376	17,381	520	644	780
	2 PM MARCH		52	52	0	1.73	2.10
6	1S2	756	36,535	34,954	1,057	1,354	1,568
	2 PM MARCH		106	106	0	1.79	2.07
7	1SW	144	10,452	11,035	201	387	495
	5 PM JULY		20	20	0	2.69	3.44
8	1W1	552	25,810	29,824	772	957	1,338
	5 PM JULY		77	77	0	1.73	2.42
9	1W2	756	36,858	40,873	1,057	1,366	1,834
	5 PM JULY		106	106	0	1.81	2.43
11	1W3	384	18,115	20,394	537	671	915
	5 PM JULY		54	54	0	1.75	2.38
18	1 E1	372	17,376	16,951	520	644	760
	10 AM JULY		52	52	0	1.73	2.04
20	1 core	1090	3,370	6,976	1,524	125	313
	8 PM JULY		152	152	0	0.11	0.29
21	1 int	4982	15,401	57,368	6,968	571	2,574
	8 PM JULY		697	697	0	0.11	0.52
22	1 int	12540	38,764	144,401	17,538	1,437	6,478
	8 PM JULY		1,754	1,754	0	0.11	0.52
33	2 E3	762	28,544	29,079	1,066	1,058	1,305
	10 AM JULY		107	107	0	1.39	1.71

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

********** AIR SYSTEM # 1 (AC1 South unit) ZONE SUMMARY **********

ZN. NO.	ZONE - DESCRIPTION PEAK TIME & MONTH	FLOOR AREA	HTG.LOSS O.A. CFM	SEN.GAIN O.A. CFM	LAT.GAIN EXH. CFM	HTG.CFM CFM/SF.	CLG.CFM CFM/SF.
34	2SE	144	9,014	6,701	201	334	301
	1 PM JULY		20	20	0	2.32	2.09
35	2S1	396	14,884	15,454	554	552	693
	2 PM MARCH		55	55	0	1.39	1.75
36	2S2	756	28,712	26,450	1,057	1,064	1,187
	2 PM MARCH		106	106	0	1.41	1.57
37	2SW	144	8,633	7,681	201	320	345
	5 PM JULY		20	20	0	2.22	2.40
38	2W1	564	21,306	25,806	789	790	1,158
	5 PM JULY		79	79	0	1.40	2.05
39	2W2	744	28,064	31,301	1,041	1,040	1,404
	5 PM JULY		104	104	0	1.40	1.89
52	2 int	11807	0	129,350	16,513	0	5,803
	8 PM JULY		1,651	1,651	0	0.00	0.49
62	3 E2	942	34,765	36,365	1,317	1,288	1,631
	10 AM JULY		132	132	0	1.37	1.73
63	3SE	144	8,848	6,671	201	328	299
	1 PM JULY		20	20	0	2.28	2.08
64	3S1	582	21,541	23,028	814	798	1,033
	2 PM MARCH		81	81	0	1.37	1.77
65	3S2	576	21,562	19,973	806	799	896
	2 PM MARCH		81	81	0	1.39	1.56
66	3SW	144	8,527	7,662	201	316	344
	5 PM JULY		20	20	0	2.19	2.39
80	3 int	11702	0	128,197	16,366	0	5,751
	8 PM JULY		1,637	1,637	0	0.00	0.49
93	4SE	144	9,245	6,711	201	343	301
	1 PM JULY		20	20	0	2.38	2.09
94	4S	1008	39,703	37,906	1,410	1,471	1,701
	2 PM MARCH		141	141	0	1.46	1.69
95	4SW1	186	12,100	11,302	260	448	507
	5 PM JULY		26	26	0	2.41	2.73

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

********** AIR SYSTEM # 1 (AC1 South unit) ZONE SUMMARY **********

ZN. NO.	ZONE - DESCRIPTION PEAK TIME & MONTH	FLOOR AREA	HTG.LOSS O.A. CFM	SEN.GAIN O.A. CFM	LAT.GAIN EXH. CFM	HTG.CFM CFM/SF.	CLG.CFM CFM/SF.
96	4SW2	144	9,635	8,987	201	357	403
	5 PM JULY		20	20	0	2.48	2.80
97	4W1	756	29,868	34,504	1,057	1,107	1,548
	5 PM JULY		106	106	0	1.46	2.05
110	4 int	11532	31,829	136,426	16,129	1,180	6,121
	6 PM JULY		1,613	1,613	0	0.10	0.53
115	loading dock	880	36,595	0	0	1,356	0
	8 AM JANUARY		123	0	0	1.54	0.00
116	Post office	300	7,693	3,707	420	285	166
	6 PM JULY		42	42	0	0.95	0.55
117	Storage	2080	61,000	20,722	2,909	2,261	930
	6 PM JULY		291	291	0	1.09	0.45
ZONE PEAK TOTALS		70,161	782,600	1,221,697	96,891	29,004	54,810
TOTAL ZONES: 37			9,813	9,690	0	0.41	0.78

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

********** AIR SYSTEM # 1 (AC1 South unit) TOTAL LOAD SUMMARY **********

AIR HANDLER DESC: AC1 South unit WITH VAV TERMINALS
SUPPLY AIR FAN: DRAW-THRU WITH PROGRAM ESTIMATED HORSEPOWER OF 58.19 HP.
FAN INPUT: 60% COMBINED FAN AND MOTOR EFF. WITH 4.50 IN WATER ACROSS THE FAN
SENSIBLE HEAT RATIO: 0.93 ----- THIS SYSTEM OCCURS 1 TIME(S) IN THE BUILDING

AIR SYSTEM PEAK TIME: 4 PM IN JULY
OUTDOOR CONDITIONS: 81 DB, 66 WB, 71.64 GRAINS INSIDE: 75 DB, 45% RH

SUMMER: VENT CONTROLS OUTSIDE AIR ----- WINTER: VENT CONTROLS OUTSIDE AIR

ZONE	SPACE SEN.LOSS:	425,213 BTUH			
INFILTRATION	SEN.LOSS:	357,387 BTUH	(	5,999 CFM)	
OUTSIDE AIR	SEN.LOSS:	487,173 BTUH	(	9,813 CFM)	
SUPPLY DUCT	SEN.LOSS:	0 BTUH			
RETURN DUCT	SEN.LOSS:	0 BTUH			
TOTAL SYSTEM	SEN.LOSS:				1,269,773 BTUH

SUPPLY AIR:782,600 / (0.999 X 1.08 X 25) =	(	29,005 CFM)	
WINTER VENT OUTSIDE AIR (33.8% OF SUPPLY):	(	9,813 CFM)	

ZONE	SPACE SEN.GAIN:	1,099,613 BTUH			
INFILTRATION	SEN.GAIN:	0 BTUH	(	0 CFM)	
DRAW-THRU FAN	SEN.GAIN:	147,636 BTUH			
SUPPLY DUCT	SEN.GAIN:	0 BTUH			
TOTAL SEN.GAIN ON SUPPLY SIDE OF COIL:					1,247,249 BTUH

SUPPLY: 1,247,249 / (0.999 X 1.10 X 23) =	(	49,332 CFM)	
SUMMER VENT OUTSIDE AIR (19.6% OF SUPPLY):	(	9,690 CFM)	

RETURN DUCT	SEN.GAIN:	0 BTUH			
RETURN PLENUM	SEN.GAIN:	0 BTUH			
OUTSIDE AIR	SEN.GAIN:	63,910 BTUH	(	9,690 CFM)	
BLOW-THRU FAN	SEN.GAIN:	0 BTUH			
TOTAL SEN.GAIN ON RETURN SIDE OF COIL:					63,910 BTUH
TOTAL SEN.GAIN ON AIR HANDLING SYSTEM:					1,311,159 BTUH
ZONE	SPACE LAT.GAIN:	96,891 BTUH			
INFILTRATION	LAT.GAIN:	0 BTUH	(	0 CFM)	
OUTSIDE AIR	LAT.GAIN:	88,937 BTUH	(	9,690 CFM)	
TOTAL LAT.GAIN ON AIR HANDLING SYSTEM:					185,828 BTUH
TOTAL SYSTEM SENSIBLE AND LATENT GAIN:					1,496,987 BTUH
TOTAL TONNAGE REQUIRED WITH OUTSIDE AIR:					124.75 TONS

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

SYSTEM LOAD ANALYSIS	LATENT	GRAINS	SENSIBLE	TEMP	CFM
LEAVING COIL CONDITION		55.240		52.000	
DRAW-THRU FAN			147,636	2.723	5,839
MISC LOAD ON SUPPLY SIDE			0	0.000	0
SUPPLY AIR DUCT			0	0.000	0
ZONE LOADS	96,891	2.890	1,099,613	20.278	43,493
ZONE CONDITION	96,891	58.130	1,247,249	75.000	49,332
RETURN AIR DUCT			0	0.000	
RETURN AIR PLENUM			0	0.000	
MISC LOAD ON RETURN SIDE			0	0.000	
VENT AIR 9,690 CFM	88,937	2.653	63,910	1.179	
BLOW-THRU FAN			0	0.000	
ENTERING COIL CONDITION	185,828	60.783	1,311,159	76.179	49,332

GENERAL PSYCHROMETRIC EQUATIONS USED IN ANALYSIS:

PR = (BAROMETRIC PRESSURE OF SITE / STANDARD ASHRAE PRESSURE OF 29.921)
TSH = PR X 1.10 X CFM X (DB.ENTERING - DB.LEAVING)
TLH = PR X 0.68 X CFM X (GRAINS.ENTERING - GRAINS.LEAVING)
GTH = PR X 4.50 X CFM X (ENTHALPY.ENTERING - ENTHALPY.LEAVING)

TSH = 0.999 X 1.10 X 49,332 X (76.179 - 52.000) = 1,311,158 BTUH
TLH = 0.999 X 0.68 X 49,332 X (60.783 - 55.240) = 185,822 BTUH
SUM = 1,496,981 BTUH
GTH = 0.999 X 4.50 X 49,332 X (27.791 - 21.037) = 1,498,478 BTUH
TOTAL SYSTEM LOAD = 1,496,987 BTUH

ENTERING COOLING COIL CONDITIONS:

DRY BULB TEMPERATURE: 76.18
WET BULB TEMPERATURE: 62.11
RELATIVE HUMIDITY(%): 45.21
ENTHALPY: 27.79 BTU/LBM

LEAVING COOLING COIL CONDITIONS:

DRY BULB TEMPERATURE: 52.00
WET BULB TEMPERATURE: 51.37
RELATIVE HUMIDITY(%): 95.95
ENTHALPY: 21.04 BTU/LBM

ENTERING HEATING COIL CONDITIONS:

DRY BULB TEMPERATURE: 54.44

LEAVING HEATING COIL CONDITIONS:

DRY BULB TEMPERATURE: 95.00

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

********** AIR SYSTEM # 2 (AC2 North unit) ZONE SUMMARY **********

ZN. NO.	ZONE - DESCRIPTION PEAK TIME & MONTH	FLOOR AREA	HTG.LOSS O.A. CFM	SEN.GAIN O.A. CFM	LAT.GAIN EXH. CFM	HTG.CFM CFM/SF.	CLG.CFM CFM/SF.
10	1W LOB	351	16,907	20,670	491	627	927
	5 PM JULY		49	49	0	1.79	2.64
31	2 E1	324	12,187	13,065	453	452	586
	10 AM JULY		45	45	0	1.40	1.81
32	2 E2	576	21,865	20,162	806	810	905
	10 AM JULY		81	81	0	1.41	1.57
40	2W5	480	15,805	17,433	671	586	782
	5 PM JULY		67	67	0	1.22	1.63
41	2W3	744	28,064	31,101	1,041	1,040	1,395
	5 PM JULY		104	104	0	1.40	1.88
48	2 E5	576	21,865	20,187	806	810	906
	10 AM JULY		81	81	0	1.41	1.57
49	2 core	1090	0	6,366	1,524	0	286
	8 PM JULY		152	152	0	0.00	0.26
50	2 core	1090	0	6,366	1,524	0	286
	8 PM JULY		152	152	0	0.00	0.26
51	2 int	8405	0	92,080	11,755	0	4,131
	8 PM JULY		1,176	1,176	0	0.00	0.49
53	2 E4	168	6,114	6,235	235	227	280
	10 AM JULY		23	23	0	1.35	1.67
61	3 E1	558	20,671	19,822	780	766	889
	10 AM JULY		78	78	0	1.37	1.59
67	3W1	756	27,424	32,872	1,057	1,016	1,475
	5 PM JULY		106	106	0	1.34	1.95
68	3W2	738	27,695	31,600	1,032	1,026	1,418
	5 PM JULY		103	103	0	1.39	1.92
69	3W3	738	27,695	31,400	1,032	1,026	1,409
	5 PM JULY		103	103	0	1.39	1.91
70	3W4	756	27,424	32,872	1,057	1,016	1,475
	5 PM JULY		106	106	0	1.34	1.95

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********** AIR SYSTEM # 2 (AC2 North unit) ZONE SUMMARY **********

ZN. NO.	ZONE - DESCRIPTION PEAK TIME & MONTH	FLOOR AREA	HTG.LOSS O.A. CFM	SEN.GAIN O.A. CFM	LAT.GAIN EXH. CFM	HTG.CFM CFM/SF.	CLG.CFM CFM/SF.
71	3NW	144	8,527	6,936	201	316	311
	5 PM JULY		20	20	0	2.19	2.16
72	3N1	576	21,562	11,174	806	799	501
	6 PM JULY		81	81	0	1.39	0.87
73	3N2	582	21,541	11,149	814	798	500
	3 PM JULY		81	81	0	1.37	0.86
74	3NE	144	8,848	5,388	201	328	242
	10 AM JULY		20	20	0	2.28	1.68
75	3 E3	942	34,765	36,365	1,317	1,288	1,631
	10 AM JULY		132	132	0	1.37	1.73
76	3 E4	558	20,671	19,694	780	766	884
	10 AM JULY		78	78	0	1.37	1.58
77	3 core	1090	0	6,366	1,524	0	286
	8 PM JULY		152	152	0	0.00	0.26
78	3 core	1090	0	6,366	1,524	0	286
	8 PM JULY		152	152	0	0.00	0.26
79	3 int	11703	0	128,213	16,368	0	5,752
	8 PM JULY		1,637	1,637	0	0.00	0.49
91	4 E1	378	14,903	13,260	529	552	595
	10 AM JULY		53	53	0	1.46	1.57
92	4 E2	1122	44,315	42,532	1,569	1,642	1,908
	10 AM JULY		157	157	0	1.46	1.70
98	4W2	558	22,574	24,473	780	837	1,098
	5 PM JULY		78	78	0	1.50	1.97
99	4W3	558	22,574	24,273	780	837	1,089
	5 PM JULY		78	78	0	1.50	1.95
100	4W4	348	13,944	16,454	487	517	738
	5 PM JULY		49	49	0	1.49	2.12
106	4 E4	378	14,903	13,132	529	552	589
	10 AM JULY		53	53	0	1.46	1.56
107	4 core	1090	1,595	6,872	1,524	59	308
	6 PM JULY		152	152	0	0.05	0.28

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********** AIR SYSTEM # 2 (AC2 North unit) ZONE SUMMARY **********

ZN. NO.	ZONE - DESCRIPTION PEAK TIME & MONTH	FLOOR AREA	HTG.LOSS O.A. CFM	SEN.GAIN O.A. CFM	LAT.GAIN EXH. CFM	HTG.CFM CFM/SF.	CLG.CFM CFM/SF.
108	4 core	1090	1,595	6,872	1,524	59	308
	6 PM JULY		152	152	0	0.05	0.28
109	4 int	7875	21,736	93,165	11,014	806	4,180
	6 PM JULY		1,101	1,101	0	0.10	0.53
113	4 E3	168	6,577	6,193	235	244	278
	10 AM JULY		23	23	0	1.45	1.65
ZONE PEAK TOTALS		47,744	534,346	861,108	66,770	19,802	38,634
TOTAL ZONES: 34			6,675	6,675	0	0.41	0.81

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

********** AIR SYSTEM # 2 (AC2 North unit) TOTAL LOAD SUMMARY **********

AIR HANDLER DESC: AC2 North unit WITH VAV TERMINALS
SUPPLY AIR FAN: DRAW-THRU WITH PROGRAM ESTIMATED HORSEPOWER OF 41.16 HP.
FAN INPUT: 60% COMBINED FAN AND MOTOR EFF. WITH 4.50 IN WATER ACROSS THE FAN
SENSIBLE HEAT RATIO: 0.93 ----- THIS SYSTEM OCCURS 1 TIME(S) IN THE BUILDING

AIR SYSTEM PEAK TIME: 5 PM IN JULY
OUTDOOR CONDITIONS: 80 DB, 66 WB, 73.24 GRAINS INSIDE: 75 DB, 45% RH

SUMMER: VENT CONTROLS OUTSIDE AIR ----- WINTER: VENT CONTROLS OUTSIDE AIR

ZONE SPACE	SEN.LOSS:	274,300 BTUH			
INFILTRATION	SEN.LOSS:	260,046 BTUH	(4,365 CFM)		
OUTSIDE AIR	SEN.LOSS:	331,382 BTUH	(6,675 CFM)		
SUPPLY DUCT	SEN.LOSS:	0 BTUH			
RETURN DUCT	SEN.LOSS:	0 BTUH			
TOTAL SYSTEM	SEN.LOSS:			865,728	BTUH

SUPPLY AIR:534,346 / (0.999 X 1.08 X 25) = (19,804 CFM)
WINTER VENT OUTSIDE AIR (33.7% OF SUPPLY): (6,675 CFM)

ZONE SPACE	SEN.GAIN:	777,828 BTUH			
INFILTRATION	SEN.GAIN:	0 BTUH	(0 CFM)		
DRAW-THRU FAN	SEN.GAIN:	104,433 BTUH			
SUPPLY DUCT	SEN.GAIN:	0 BTUH			
TOTAL SEN.GAIN ON SUPPLY SIDE OF COIL:				882,261	BTUH

SUPPLY AIR:882,261 / (0.999 X 1.10 X 23) = (34,896 CFM)
SUMMER VENT OUTSIDE AIR (19.1% OF SUPPLY): (6,675 CFM)

RETURN DUCT	SEN.GAIN:	0 BTUH			
RETURN PLENUM	SEN.GAIN:	0 BTUH			
OUTSIDE AIR	SEN.GAIN:	36,684 BTUH	(6,675 CFM)		
BLOW-THRU FAN	SEN.GAIN:	0 BTUH			
TOTAL SEN.GAIN ON RETURN SIDE OF COIL:				36,684	BTUH
TOTAL SEN.GAIN ON AIR HANDLING SYSTEM:				918,945	BTUH
ZONE SPACE	LAT.GAIN:	66,770 BTUH			
INFILTRATION	LAT.GAIN:	0 BTUH	(0 CFM)		
OUTSIDE AIR	LAT.GAIN:	68,557 BTUH	(6,675 CFM)		
TOTAL LAT.GAIN ON AIR HANDLING SYSTEM:				135,327	BTUH
TOTAL SYSTEM SENSIBLE AND LATENT GAIN:				1,054,272	BTUH
TOTAL TONNAGE REQUIRED WITH OUTSIDE AIR:				87.86	TONS

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

SYSTEM LOAD ANALYSIS	LATENT	GRAINS	SENSIBLE	TEMP	CFM
LEAVING COIL CONDITION		55.314		52.000	
DRAW-THRU FAN			104,433	2.723	4,131
MISC LOAD ON SUPPLY SIDE			0	0.000	0
SUPPLY AIR DUCT			0	0.000	0
ZONE LOADS	66,770	2.816	777,828	20.278	30,765
ZONE CONDITION	66,770	58.130	882,261	75.000	34,896
RETURN AIR DUCT			0	0.000	
RETURN AIR PLENUM			0	0.000	
MISC LOAD ON RETURN SIDE			0	0.000	
VENT AIR 6,675 CFM	68,557	2.891	36,684	0.956	
BLOW-THRU FAN			0	0.000	
ENTERING COIL CONDITION	135,327	61.021	918,945	75.956	34,896

GENERAL PSYCHROMETRIC EQUATIONS USED IN ANALYSIS:

PR = (BAROMETRIC PRESSURE OF SITE / STANDARD ASHRAE PRESSURE OF 29.921)
TSH = PR X 1.10 X CFM X (DB.ENTERING - DB.LEAVING)
TLH = PR X 0.68 X CFM X (GRAINS.ENTERING - GRAINS.LEAVING)
GTH = PR X 4.50 X CFM X (ENTHALPY.ENTERING - ENTHALPY.LEAVING)

TSH = 0.999 X 1.10 X	34,896 X (	75.956 -	52.000) =	918,947	BTUH
TLH = 0.999 X 0.68 X	34,896 X (	61.021 -	55.314) =	135,329	BTUH
SUM =				1,054,277	BTUH
GTH = 0.999 X 4.50 X	34,896 X (	27.774 -	21.048) =	1,055,510	BTUH
TOTAL SYSTEM LOAD			=	1,054,272	BTUH

ENTERING COOLING COIL CONDITIONS:

DRY BULB TEMPERATURE: 75.96
WET BULB TEMPERATURE: 62.08
RELATIVE HUMIDITY(%): 45.72
ENTHALPY: 27.77 BTU/LBM

ENTERING HEATING COIL CONDITIONS:

DRY BULB TEMPERATURE: 54.49

LEAVING COOLING COIL CONDITIONS:

DRY BULB TEMPERATURE: 52.00
WET BULB TEMPERATURE: 51.39
RELATIVE HUMIDITY(%): 96.08
ENTHALPY: 21.05 BTU/LBM

LEAVING HEATING COIL CONDITIONS:

DRY BULB TEMPERATURE: 95.00

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

********** AIR SYSTEM # 3 (AC3 1st flr detention) ZONE SUMMARY **********

ZN. NO.	ZONE - DESCRIPTION PEAK TIME & MONTH	FLOOR AREA	HTG.LOSS O.A. CFM	SEN.GAIN O.A. CFM	LAT.GAIN EXH. CFM	HTG.CFM CFM/SF.	CLG.CFM CFM/SF.
12	1W4	552	25,810	29,824	772	957	1,338
	5 PM JULY		77	77	0	1.73	2.42
13	1NW	144	10,452	10,053	201	387	451
	5 PM JULY		20	20	0	2.69	3.13
14	1N1	756	36,535	17,017	1,057	1,354	763
	3 PM JULY		106	106	0	1.79	1.01
15	1N2	372	17,376	8,008	520	644	359
	3 PM JULY		52	52	0	1.73	0.97
16	1NE	144	11,810	8,429	201	438	378
	10 AM JULY		20	20	0	3.04	2.63
17	1 SALLY PORT	1320	57,390	40,632	1,846	2,127	1,823
	10 AM JULY		185	185	0	1.61	1.38
19	1 core	1090	3,370	6,976	1,524	125	313
	8 PM JULY		152	152	0	0.11	0.29
23	1W3	372	18,964	20,402	520	703	915
	5 PM JULY		52	52	0	1.89	2.46
24	1 E1	168	8,042	8,129	235	298	365
	10 AM JULY		23	23	0	1.77	2.17
25	1 int detention	7558	23,363	87,033	10,571	866	3,905
	8 PM JULY		1,057	1,057	0	0.11	0.52
		12,476	213,112	236,503	17,447	7,899	10,610
ZONE PEAK TOTALS							
TOTAL ZONES: 10			1,744	1,744	0	0.63	0.85

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

******** AIR SYSTEM # 3 (AC3 1st flr detention) TOTAL LOAD SUMMARY *********

AIR HANDLER DESC: AC3 1st flr detention WITH VAV TERMINALS
SUPPLY AIR FAN: DRAW-THRU WITH PROGRAM ESTIMATED HORSEPOWER OF 11.54 HP.
FAN INPUT: 60% COMBINED FAN AND MOTOR EFF. WITH 4.50 IN WATER ACROSS THE FAN
SENSIBLE HEAT RATIO: 0.93 ----- THIS SYSTEM OCCURS 1 TIME(S) IN THE BUILDING

AIR SYSTEM PEAK TIME: 5 PM IN JULY
OUTDOOR CONDITIONS: 80 DB, 66 WB, 73.24 GRAINS INSIDE: 75 DB, 45% RH

SUMMER: VENT CONTROLS OUTSIDE AIR ----- WINTER: VENT CONTROLS OUTSIDE AIR

ZONE SPACE	SEN.LOSS:	125,358 BTUH			
INFILTRATION	SEN.LOSS:	87,754 BTUH	(	1,473 CFM)	
OUTSIDE AIR	SEN.LOSS:	86,583 BTUH	(	1,744 CFM)	
SUPPLY DUCT	SEN.LOSS:	0 BTUH			
RETURN DUCT	SEN.LOSS:	0 BTUH			
TOTAL SYSTEM	SEN.LOSS:				299,695 BTUH
SUPPLY AIR:213,112 / (0.999 X 1.08 X 25) =			(	7,898 CFM)	
WINTER VENT OUTSIDE AIR (22.1% OF SUPPLY):			(	1,744 CFM)	
ZONE SPACE	SEN.GAIN:	218,013 BTUH			
INFILTRATION	SEN.GAIN:	0 BTUH	(	0 CFM)	
DRAW-THRU FAN	SEN.GAIN:	29,271 BTUH			
SUPPLY DUCT	SEN.GAIN:	0 BTUH			
TOTAL SEN.GAIN ON SUPPLY SIDE OF COIL:					247,284 BTUH
SUPPLY AIR:247,284 / (0.999 X 1.10 X 23) =			(	9,781 CFM)	
SUMMER VENT OUTSIDE AIR (17.8% OF SUPPLY):			(	1,744 CFM)	
RETURN DUCT	SEN.GAIN:	0 BTUH			
RETURN PLENUM	SEN.GAIN:	0 BTUH			
OUTSIDE AIR	SEN.GAIN:	9,586 BTUH	(	1,744 CFM)	
BLOW-THRU FAN	SEN.GAIN:	0 BTUH			
TOTAL SEN.GAIN ON RETURN SIDE OF COIL:					9,586 BTUH
TOTAL SEN.GAIN ON AIR HANDLING SYSTEM:					256,870 BTUH
ZONE SPACE	LAT.GAIN:	17,447 BTUH			
INFILTRATION	LAT.GAIN:	0 BTUH	(	0 CFM)	
OUTSIDE AIR	LAT.GAIN:	17,912 BTUH	(	1,744 CFM)	
TOTAL LAT.GAIN ON AIR HANDLING SYSTEM:					35,359 BTUH
TOTAL SYSTEM SENSIBLE AND LATENT GAIN:					292,229 BTUH
TOTAL TONNAGE REQUIRED WITH OUTSIDE AIR:					24.35 TONS

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

SYSTEM LOAD ANALYSIS	LATENT	GRAINS	SENSIBLE	TEMP	CFM
LEAVING COIL CONDITION		55.506		52.000	
DRAW-THRU FAN			29,271	2.723	1,158
MISC LOAD ON SUPPLY SIDE			0	0.000	0
SUPPLY AIR DUCT			0	0.000	0
ZONE LOADS	17,447	2.625	218,013	20.278	8,623
ZONE CONDITION	17,447	58.131	247,284	75.000	9,781
RETURN AIR DUCT			0	0.000	
RETURN AIR PLENUM			0	0.000	
MISC LOAD ON RETURN SIDE			0	0.000	
VENT AIR 1,744 CFM	17,912	2.695	9,586	0.892	
BLOW-THRU FAN			0	0.000	
ENTERING COIL CONDITION	35,359	60.826	256,870	75.892	9,781

GENERAL PSYCHROMETRIC EQUATIONS USED IN ANALYSIS:

PR = (BAROMETRIC PRESSURE OF SITE / STANDARD ASHRAE PRESSURE OF 29.921)
TSH = PR X 1.10 X CFM X (DB.ENTERING - DB.LEAVING)
TLH = PR X 0.68 X CFM X (GRAINS.ENTERING - GRAINS.LEAVING)
GTH = PR X 4.50 X CFM X (ENTHALPY.ENTERING - ENTHALPY.LEAVING)

TSH = 0.999 X 1.10 X	9,781 X (75.892 -	52.000) =	256,869	BTUH
TLH = 0.999 X 0.68 X	9,781 X (60.826 -	55.506) =	35,358	BTUH
SUM =			292,227	BTUH
GTH = 0.999 X 4.50 X	9,781 X (27.728 -	21.078) =	292,497	BTUH
TOTAL SYSTEM LOAD		=	292,229	BTUH

ENTERING COOLING COIL CONDITIONS:

DRY BULB TEMPERATURE: 75.89
WET BULB TEMPERATURE: 62.02
RELATIVE HUMIDITY(%): 45.69
ENTHALPY: 27.73 BTU/LBM

LEAVING COOLING COIL CONDITIONS:

DRY BULB TEMPERATURE: 52.00
WET BULB TEMPERATURE: 51.44
RELATIVE HUMIDITY(%): 96.41
ENTHALPY: 21.08 BTU/LBM

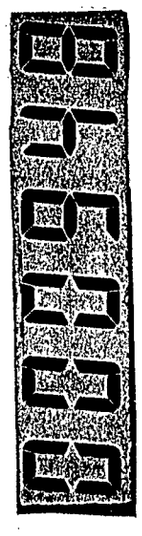
ENTERING HEATING COIL CONDITIONS:

DRY BULB TEMPERATURE: 59.84

LEAVING HEATING COIL CONDITIONS:

DRY BULB TEMPERATURE: 95.00

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.



********** AIR SYSTEM # 4 (AC2 2 flr north expansion) ZONE SUMMARY *********

ZN. NO.	ZONE - DESCRIPTION PEAK TIME & MONTH	FLOOR AREA	HTG.LOSS O.A. CFM	SEN.GAIN O.A. CFM	LAT.GAIN EXH. CFM	HTG.CFM CFM/SF.	CLG.CFM CFM/SF.
42	2W4	564	21,306	25,806	789	790	1,158
	5 PM JULY		79	79	0	1.40	2.05
43	2NW	144	8,633	6,955	201	320	312
	5 PM JULY		20	20	0	2.22	2.17
44	2N1	756	28,712	14,610	1,057	1,064	655
	6 PM JULY		106	106	0	1.41	0.87
45	2N2	396	14,884	7,574	554	552	340
	3 PM JULY		55	55	0	1.39	0.86
46	2NE	144	9,014	5,418	201	334	243
	10 AM JULY		20	20	0	2.32	1.69
47	2 E4	594	21,841	22,739	831	809	1,020
	10 AM JULY		83	83	0	1.36	1.72
54	2 int	3402	0	37,269	4,758	0	1,672
	8 PM JULY		476	476	0	0.00	0.49
ZONE PEAK TOTALS		6,000	104,390	120,371	8,391	3,869	5,400
TOTAL ZONES: 7			839	839	0	0.64	0.90

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

****** AIR SYSTEM # 4 (AC2 2 flr north expansion) TOTAL LOAD SUMMARY *******

AIR HANDLER DESC: AC2 2 flr north expansion WITH VAV TERMINALS
SUPPLY AIR FAN: DRAW-THRU WITH PROGRAM ESTIMATED HORSEPOWER OF 5.79 HP.
FAN INPUT: 60% COMBINED FAN AND MOTOR EFF. WITH 4.50 IN WATER ACROSS THE FAN
SENSIBLE HEAT RATIO: 0.94 ----- THIS SYSTEM OCCURS 1 TIME(S) IN THE BUILDING

AIR SYSTEM PEAK TIME: 5 PM IN JULY
OUTDOOR CONDITIONS: 80 DB, 66 WB, 73.24 GRAINS INSIDE: 75 DB, 45% RH

SUMMER: VENT CONTROLS OUTSIDE AIR ----- WINTER: VENT CONTROLS OUTSIDE AIR

ZONE SPACE SEN.LOSS:	51,072 BTUH			
INFILTRATION SEN.LOSS:	53,318 BTUH	(	895 CFM)	
OUTSIDE AIR SEN.LOSS:	41,653 BTUH	(	839 CFM)	
SUPPLY DUCT SEN.LOSS:	0 BTUH			
RETURN DUCT SEN.LOSS:	0 BTUH			
TOTAL SYSTEM SEN.LOSS:				146,043 BTUH
SUPPLY AIR:104,390 / (0.999 X 1.08 X 25) =		(	3,869 CFM)	
WINTER VENT OUTSIDE AIR (21.7% OF SUPPLY):		(	839 CFM)	
ZONE SPACE SEN.GAIN:	109,403 BTUH			
INFILTRATION SEN.GAIN:	0 BTUH	(	0 CFM)	
DRAW-THRU FAN SEN.GAIN:	14,689 BTUH			
SUPPLY DUCT SEN.GAIN:	0 BTUH			
TOTAL SEN.GAIN ON SUPPLY SIDE OF COIL:				124,092 BTUH
SUPPLY AIR:124,092 / (0.999 X 1.10 X 23) =		(	4,908 CFM)	
SUMMER VENT OUTSIDE AIR (17.1% OF SUPPLY):		(	839 CFM)	
RETURN DUCT SEN.GAIN:	0 BTUH			
RETURN PLENUM SEN.GAIN:	0 BTUH			
OUTSIDE AIR SEN.GAIN:	4,611 BTUH	(	839 CFM)	
BLOW-THRU FAN SEN.GAIN:	0 BTUH			
TOTAL SEN.GAIN ON RETURN SIDE OF COIL:				4,611 BTUH
TOTAL SEN.GAIN ON AIR HANDLING SYSTEM:				128,703 BTUH
ZONE SPACE LAT.GAIN:	8,391 BTUH			
INFILTRATION LAT.GAIN:	0 BTUH	(	0 CFM)	
OUTSIDE AIR LAT.GAIN:	8,617 BTUH	(	839 CFM)	
TOTAL LAT.GAIN ON AIR HANDLING SYSTEM:				17,008 BTUH
TOTAL SYSTEM SENSIBLE AND LATENT GAIN:				145,711 BTUH
TOTAL TONNAGE REQUIRED WITH OUTSIDE AIR:				12.14 TONS

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

DSHS

SYSTEM LOAD ANALYSIS	LATENT	GRAINS	SENSIBLE	TEMP	CFM
LEAVING COIL CONDITION		55.615		52.000	
DRAW-THRU FAN			14,689	2.723	581
MISC LOAD ON SUPPLY SIDE			0	0.000	0
SUPPLY AIR DUCT			0	0.000	0
ZONE LOADS	8,391	2.516	109,403	20.278	4,327
ZONE CONDITION	8,391	58.131	124,092	75.000	4,908
RETURN AIR DUCT			0	0.000	
RETURN AIR PLENUM			0	0.000	
MISC LOAD ON RETURN SIDE			0	0.000	
VENT AIR 839 CFM	8,617	2.584	4,611	0.855	
BLOW-THRU FAN			0	0.000	
ENTERING COIL CONDITION	17,008	60.714	128,703	75.855	4,908

GENERAL PSYCHROMETRIC EQUATIONS USED IN ANALYSIS:

PR = (BAROMETRIC PRESSURE OF SITE / STANDARD ASHRAE PRESSURE OF 29.921)
TSH = PR X 1.10 X CFM X (DB.ENTERING - DB.LEAVING)
TLH = PR X 0.68 X CFM X (GRAINS.ENTERING - GRAINS.LEAVING)
GTH = PR X 4.50 X CFM X (ENTHALPY.ENTERING - ENTHALPY.LEAVING)

TSH = 0.999 X 1.10 X 4,908 X (75.855 - 52.000) = 128,702 BTUH
TLH = 0.999 X 0.68 X 4,908 X (60.714 - 55.615) = 17,008 BTUH

SUM = 145,710 BTUH
GTH = 0.999 X 4.50 X 4,908 X (27.702 - 21.095) = 145,824 BTUH

TOTAL SYSTEM LOAD = 145,711 BTUH

ENTERING COOLING COIL CONDITIONS:

DRY BULB TEMPERATURE: 75.85
WET BULB TEMPERATURE: 61.98
RELATIVE HUMIDITY(%): 45.66
ENTHALPY: 27.70 BTU/LBM

ENTERING HEATING COIL CONDITIONS:

DRY BULB TEMPERATURE: 60.02

LEAVING COOLING COIL CONDITIONS:

DRY BULB TEMPERATURE: 52.00
WET BULB TEMPERATURE: 51.47
RELATIVE HUMIDITY(%): 96.61
ENTHALPY: 21.09 BTU/LBM

LEAVING HEATING COIL CONDITIONS:

DRY BULB TEMPERATURE: 95.00

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

********** AIR SYSTEM # 5 (AC2 4 flr north expansion) ZONE SUMMARY *********

ZN. NO.	ZONE - DESCRIPTION PEAK TIME & MONTH	FLOOR AREA	HTG.LOSS O.A. CFM	SEN.GAIN O.A. CFM	LAT.GAIN EXH. CFM	HTG.CFM CFM/SF.	CLG.CFM CFM/SF.
101	4NW1	144	9,635	7,981	201	357	358
	5 PM JULY		20	20	0	2.48	2.49
102	4NW2	186	12,100	10,154	260	448	456
	5 PM JULY		26	26	0	2.41	2.45
103	4N	1008	39,703	19,793	1,410	1,471	888
	6 PM JULY		141	141	0	1.46	0.88
104	4NE	144	9,245	5,352	201	343	240
	10 AM JULY		20	20	0	2.38	1.67
105	4 E3	954	37,736	36,342	1,334	1,399	1,630
	10 AM JULY		133	133	0	1.47	1.71
112	4W4	408	15,923	18,052	571	590	810
	5 PM JULY		57	57	0	1.45	1.99
114	4 int	3656	10,091	43,251	5,113	374	1,940
	6 PM JULY		511	511	0	0.10	0.53
ZONE PEAK TOTALS		6,500	134,433	140,925	9,090	4,982	6,322
TOTAL ZONES: 7			908	908	0	0.77	0.97

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

****** AIR SYSTEM # 5 (AC2 4 flr north expansion) TOTAL LOAD SUMMARY *******

AIR HANDLER DESC: AC2 4 flr north expansion WITH VAV TERMINALS
SUPPLY AIR FAN: DRAW-THRU WITH PROGRAM ESTIMATED HORSEPOWER OF 6.64 HP.
FAN INPUT: 60% COMBINED FAN AND MOTOR EFF. WITH 4.50 IN WATER ACROSS THE FAN
SENSIBLE HEAT RATIO: 0.94 ----- THIS SYSTEM OCCURS 1 TIME(S) IN THE BUILDING

AIR SYSTEM PEAK TIME: 5 PM IN JULY
OUTDOOR CONDITIONS: 80 DB, 66 WB, 73.24 GRAINS INSIDE: 75 DB, 45% RH

SUMMER: VENT CONTROLS OUTSIDE AIR ----- WINTER: VENT CONTROLS OUTSIDE AIR

ZONE SPACE	SEN.LOSS:	74,383 BTUH			
INFILTRATION	SEN.LOSS:	60,050 BTUH	(1,008 CFM)		
OUTSIDE AIR	SEN.LOSS:	45,079 BTUH	(908 CFM)		
SUPPLY DUCT	SEN.LOSS:	0 BTUH			
RETURN DUCT	SEN.LOSS:	0 BTUH			
TOTAL SYSTEM	SEN.LOSS:				179,512 BTUH
SUPPLY AIR:134,433 / (0.999 X 1.08 X 25) =			(4,982 CFM)		
WINTER VENT OUTSIDE AIR (18.2% OF SUPPLY):			(908 CFM)		
ZONE SPACE	SEN.GAIN:	125,465 BTUH			
INFILTRATION	SEN.GAIN:	0 BTUH	(0 CFM)		
DRAW-THRU FAN	SEN.GAIN:	16,845 BTUH			
SUPPLY DUCT	SEN.GAIN:	0 BTUH			
TOTAL SEN.GAIN ON SUPPLY SIDE OF COIL:					142,310 BTUH
SUPPLY AIR:142,310 / (0.999 X 1.10 X 23) =			(5,629 CFM)		
SUMMER VENT OUTSIDE AIR (16.1% OF SUPPLY):			(908 CFM)		
RETURN DUCT	SEN.GAIN:	0 BTUH			
RETURN PLENUM	SEN.GAIN:	0 BTUH			
OUTSIDE AIR	SEN.GAIN:	4,991 BTUH	(908 CFM)		
BLOW-THRU FAN	SEN.GAIN:	0 BTUH			
TOTAL SEN.GAIN ON RETURN SIDE OF COIL:					4,991 BTUH
TOTAL SEN.GAIN ON AIR HANDLING SYSTEM:					147,301 BTUH
ZONE SPACE	LAT.GAIN:	9,090 BTUH			
INFILTRATION	LAT.GAIN:	0 BTUH	(0 CFM)		
OUTSIDE AIR	LAT.GAIN:	9,325 BTUH	(908 CFM)		
TOTAL LAT.GAIN ON AIR HANDLING SYSTEM:					18,415 BTUH
TOTAL SYSTEM SENSIBLE AND LATENT GAIN:					165,716 BTUH
TOTAL TONNAGE REQUIRED WITH OUTSIDE AIR:					13.81 TONS

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

SYSTEM LOAD ANALYSIS	LATENT	GRAINS	SENSIBLE	TEMP	CFM
LEAVING COIL CONDITION		55.754		52.000	
DRAW-THRU FAN			16,845	2.723	667
MISC LOAD ON SUPPLY SIDE			0	0.000	0
SUPPLY AIR DUCT			0	0.000	0
ZONE LOADS	9,090	2.377	125,465	20.278	4,962
ZONE CONDITION	9,090	58.130	142,310	75.000	5,629
RETURN AIR DUCT			0	0.000	
RETURN AIR PLENUM			0	0.000	
MISC LOAD ON RETURN SIDE			0	0.000	
VENT AIR 908 CFM	9,325	2.438	4,991	0.807	
BLOW-THRU FAN			0	0.000	
ENTERING COIL CONDITION	18,415	60.568	147,301	75.807	5,629

GENERAL PSYCHROMETRIC EQUATIONS USED IN ANALYSIS:

PR = (BAROMETRIC PRESSURE OF SITE / STANDARD ASHRAE PRESSURE OF 29.921)
TSH = PR X 1.10 X CFM X (DB.ENTERING - DB.LEAVING)
TLH = PR X 0.68 X CFM X (GRAINS.ENTERING - GRAINS.LEAVING)
GTH = PR X 4.50 X CFM X (ENTHALPY.ENTERING - ENTHALPY.LEAVING)

TSH = 0.999 X 1.10 X 5,629 X (75.807 - 52.000) = 147,299 BTUH
TLH = 0.999 X 0.68 X 5,629 X (60.568 - 55.754) = 18,416 BTUH
SUM = 165,715 BTUH
GTH = 0.999 X 4.50 X 5,629 X (27.667 - 21.116) = 165,814 BTUH
TOTAL SYSTEM LOAD = 165,716 BTUH

ENTERING COOLING COIL CONDITIONS:

DRY BULB TEMPERATURE: 75.81
WET BULB TEMPERATURE: 61.93
RELATIVE HUMIDITY(%): 45.62
ENTHALPY: 27.67 BTU/LBM

LEAVING COOLING COIL CONDITIONS:

DRY BULB TEMPERATURE: 52.00
WET BULB TEMPERATURE: 51.50
RELATIVE HUMIDITY(%): 96.80
ENTHALPY: 21.12 BTU/LBM

ENTERING HEATING COIL CONDITIONS:

DRY BULB TEMPERATURE: 61.62

LEAVING HEATING COIL CONDITIONS:

DRY BULB TEMPERATURE: 95.00

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

********** AIR SYSTEM # 6 (AC4 Elev Penthouse) ZONE SUMMARY **********

ZN. NO.	ZONE - DESCRIPTION PEAK TIME & MONTH	FLOOR AREA	HTG.LOSS O.A. CFM	SEN.GAIN O.A. CFM	LAT.GAIN EXH. CFM	HTG.CFM CFM/SF.	CLG.CFM CFM/SF.
111	Elev Penthouse	1024	22,298	81,693	0	826	3,665
	4 PM JULY		0	0	0	0.81	3.58
	ZONE PEAK TOTALS	1,024	22,298	81,693	0	826	3,665
	TOTAL ZONES: 1		0	0	0	0.81	3.58

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

********** AIR SYSTEM # 6 (AC4 Elev Penthouse) TOTAL LOAD SUMMARY **********

AIR HANDLER DESC: AC4 Elev Penthouse WITH VAV TERMINALS
SUPPLY AIR FAN: DRAW-THRU WITH PROGRAM ESTIMATED HORSEPOWER OF 4.32 HP.
FAN INPUT: 60% COMBINED FAN AND MOTOR EFF. WITH 4.50 IN WATER ACROSS THE FAN
SENSIBLE HEAT RATIO: 1.00 ----- THIS SYSTEM OCCURS 1 TIME(S) IN THE BUILDING

AIR SYSTEM PEAK TIME: 4 PM IN JULY
OUTDOOR CONDITIONS: 81 DB, 66 WB, 71.64 GRAINS INSIDE: 85 DB, 45% RH

SUMMER: NONE CONTROLS OUTSIDE AIR ----- WINTER: NONE CONTROLS OUTSIDE AIR

ZONE SPACE	SEN.LOSS:	15,685 BTUH		
INFILTRATION	SEN.LOSS:	6,613 BTUH	(111 CFM)	
OUTSIDE AIR	SEN.LOSS:	0 BTUH	(0 CFM)	
SUPPLY DUCT	SEN.LOSS:	0 BTUH		
RETURN DUCT	SEN.LOSS:	0 BTUH		
TOTAL SYSTEM	SEN.LOSS:			22,298 BTUH
SUPPLY AIR: 22,298 / (0.999 X 1.08 X 25) =			(826 CFM)	
WINTER VENT OUTSIDE AIR (0.00% OF SUPPLY):			(0 CFM)	
ZONE SPACE	SEN.GAIN:	81,693 BTUH		
INFILTRATION	SEN.GAIN:	0 BTUH	(0 CFM)	
DRAW-THRU FAN	SEN.GAIN:	10,968 BTUH		
SUPPLY DUCT	SEN.GAIN:	0 BTUH		
TOTAL SEN.GAIN ON SUPPLY SIDE OF COIL:				92,661 BTUH
SUPPLY AIR: 92,661 / (0.999 X 1.10 X 23) =			(3,665 CFM)	
SUMMER VENT OUTSIDE AIR (0.00% OF SUPPLY):			(0 CFM)	
RETURN DUCT	SEN.GAIN:	0 BTUH		
RETURN PLENUM	SEN.GAIN:	0 BTUH		
OUTSIDE AIR	SEN.GAIN:	0 BTUH	(0 CFM)	
BLOW-THRU FAN	SEN.GAIN:	0 BTUH		
TOTAL SEN.GAIN ON RETURN SIDE OF COIL:				0 BTUH
TOTAL SEN.GAIN ON AIR HANDLING SYSTEM:				92,661 BTUH
ZONE SPACE	LAT.GAIN:	0 BTUH		
INFILTRATION	LAT.GAIN:	0 BTUH	(0 CFM)	
OUTSIDE AIR	LAT.GAIN:	0 BTUH	(0 CFM)	
TOTAL LAT.GAIN ON AIR HANDLING SYSTEM:				0 BTUH
TOTAL SYSTEM SENSIBLE AND LATENT GAIN:				92,661 BTUH
TOTAL TONNAGE REQUIRED WITH OUTSIDE AIR:				7.72 TONS

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

******** AIR SYSTEM # 6 (AC4 Elev Penthouse) PSYCHROMETRIC ANALYSIS ********

SYSTEM LOAD ANALYSIS	LATENT	GRAINS	SENSIBLE	TEMP	CFM
LEAVING COIL CONDITION		81.034		62.000	
DRAW-THRU FAN			10,968	2.723	434
MISC LOAD ON SUPPLY SIDE			0	0.000	0
SUPPLY AIR DUCT			0	0.000	0
ZONE LOADS	0	0.000	81,693	20.278	3,231
ZONE CONDITION	0	81.034	92,661	85.000	3,665
RETURN AIR DUCT			0	0.000	
RETURN AIR PLENUM			0	0.000	
MISC LOAD ON RETURN SIDE			0	0.000	
VENT AIR 0 CFM	0	0.000	0	0.000	
BLOW-THRU FAN			0	0.000	
ENTERING COIL CONDITION	0	81.034	92,661	85.000	3,665

LVG. COIL DB SPECIFIED WAS NOT POSSIBLE. A LVG. COIL VALUE OF 62 WAS USED.

GENERAL PSYCHROMETRIC EQUATIONS USED IN ANALYSIS:

PR = (BAROMETRIC PRESSURE OF SITE / STANDARD ASHRAE PRESSURE OF 29.921)
TSH = PR X 1.10 X CFM X (DB.ENTERING - DB.LEAVING)
TLH = PR X 0.68 X CFM X (GRAINS.ENTERING - GRAINS.LEAVING)
GTH = PR X 4.50 X CFM X (ENTHALPY.ENTERING - ENTHALPY.LEAVING)

TSH = 0.999 X 1.10 X 3,665 X (85.000 - 62.000) = 92,660 BTUH
TLH = 0.999 X 0.68 X 3,665 X (81.034 - 81.034) = 0 BTUH

SUM = 92,660 BTUH
GTH = 0.999 X 4.50 X 3,665 X (33.122 - 27.483) = 92,924 BTUH

TOTAL SYSTEM LOAD = 92,661 BTUH

ENTERING COOLING COIL CONDITIONS:

DRY BULB TEMPERATURE: 85.00
WET BULB TEMPERATURE: 69.08
RELATIVE HUMIDITY(%): 45.00
ENTHALPY: 33.12 BTU/LBM

ENTERING HEATING COIL CONDITIONS:

DRY BULB TEMPERATURE: 70.00

LEAVING COOLING COIL CONDITIONS:

DRY BULB TEMPERATURE: 62.00
WET BULB TEMPERATURE: 61.54
RELATIVE HUMIDITY(%): 97.53
ENTHALPY: 27.48 BTU/LBM

LEAVING HEATING COIL CONDITIONS:

DRY BULB TEMPERATURE: 95.00

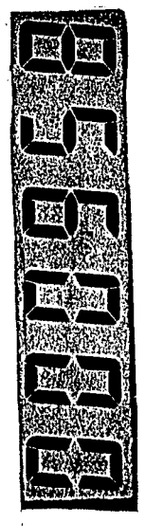
NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

ENVELOPE REPORT USING SUMMER U-FACTORS:

MATERIAL TYPES	GROSS AREA	GLASS AREA	NET AREA	-U- FACTOR	AREA x UFACTOR	AVERAGE UFACTOR
ROOF 1	36209.5	0.0	36209.5	0.050	1810.475	0.050
WALL 1	49468.0	17572.0	31896.0	0.140	4465.440	0.140
2	180.0	0.0	180.0	0.600	108.000	0.600
TOT.WALL	49648.0	17572.0	32076.0	N/A	4573.440	0.143
GLASS 1	11992.0	N/A	11992.0	0.500	5996.000	0.500
2	5580.0	N/A	5580.0	0.500	2790.000	0.500
TOT.GLAS	17572.0	N/A	17572.0	N/A	8786.000	0.500
TOTALS			85857.5	N/A	15169.915	0.177

WALL DIRECTION	WALL AREA	GLASS AREA	WALL NET AREA	W.AVG U-FAC	GLASS AVG U-FACTOR	GLASS AVG SHD.COEFF
N	9878.0	2606.0	7272.0	0.140	0.500	0.450
NE	0.0	0.0	0.0	0.000	0.000	0.000
E	16145.0	6177.0	9968.0	0.148	0.500	0.450
SE	0.0	0.0	0.0	0.000	0.000	0.000
S	7983.0	2606.0	5377.0	0.140	0.500	0.450
SW	0.0	0.0	0.0	0.000	0.000	0.000
W	15642.0	6183.0	9459.0	0.140	0.500	0.450
NW	0.0	0.0	0.0	0.000	0.000	0.000
TOTALS	49648.0	17572.0	32076.0	0.143	0.500	0.450

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.



********** TOTAL BUILDING LOAD SUMMARY **********

BUILDING PEAKS IN JULY AT 5 PM

BLDG. LOAD DESCRIPTIONS	AREA QUAN	SEN. LOSS	%TOT LOSS	LAT. GAIN	+ SEN. GAIN	= TOTAL GAIN	%TOT GAIN
ROOF	36,210	99,951	3.59	0	31,180	31,180	0.96
WALL	32,086	252,551	9.07	0	134,908	134,908	4.16
GLASS	17,572	484,988	17.43	0	635,392	635,392	19.61
SKIN LOADS	85,868	837,490	30.09	0	801,480	801,480	24.73
LIGHTING	171,631	0	0.00	0	585,260	585,260	18.06
EQUIPMENT	219,140	0	0.00	0	747,271	747,271	23.06
PEOPLE	997	0	0.00	198,589	248,262	446,851	13.79
PARTITION	41,576	128,518	4.62	0	22,785	22,785	0.70
VENT 19,979	19,856	991,870	35.64	203,944	109,133	313,077	9.66
INFL 13,851	0	825,168	29.65	0	0	0	0.00
DRAW-THRU FAN		0	0.00	0	323,842	323,842	9.99
BLOW-THRU FAN		0	0.00	0	0	0	0.00
SUPPLY DUCT		0	0.00	0	0	0	0.00
RETURN DUCT		0	0.00	0	0	0	0.00
BUILDING TOTALS		2,783,046	100.00	402,533	2,838,033	3,240,566	100.00

BUILDING SUMMARY LOAD DESCRIPTIONS	SEN. LOSS	%TOT LOSS	LAT. GAIN	+ SEN. GAIN	= TOTAL GAIN	%TOT GAIN
VENTILATION	991,870	35.64	203,944	109,133	313,077	9.66
INFILTRATION	825,168	29.65	0	0	0	0.00
ZONE LOADS	966,008	34.71	198,589	2,405,058	2,603,647	80.35
PLENUM LOADS	0	0.00	0	0	0	0.00
FAN & DUCT LOADS	0	0.00	0	323,842	323,842	9.99
BUILDING TOTALS	2,783,046	100.00	402,533	2,838,033	3,240,566	100.00

TOTAL BUILDING SUPPLY AIR (BASED ON A 23 TD): 108,211 CFM
TOTAL BUILDING VENT AIR (18.34% OF SUPPLY): 19,856 CFM

TOTAL CONDITIONED AIR SPACE: 143,905 SQ.FT
SUPPLY AIR CFM/SQ.FT. OF CONDITIONED SPACE: 0.7520 CFM/SQ.FT
SQ.FT OF CONDITIONED AIR SPACE PER TON: 532.8884 SQ.FT/TON
TONNAGE PER SQ.FT OF CONDITIONED AIR SPACE: 0.0019 TONS/SQ.FT

TOTAL HEATING REQUIRED WITH OUTSIDE AIR: 2,783.05 MBH
TOTAL TONNAGE REQUIRED WITH OUTSIDE AIR: 270.05 TONS

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2001 Washington State Nonresidential Energy Code Compliance Form

Mechanical Summary — MECH-SUM

2001 Washington State Nonresidential Energy Code Compliance Forms — June 2002 - KJM

Project Info			
	Project Address	DEPARTMENT OF HOMELAND SECURITY	Date 4/29/2003
		12500 TUKWILA INTERNATIONAL BLVD.	For Building Dept. Use
		SEATTLE, WASHINGTON	RECEIVED CITY OF TUKWILA APR 3 0 2003 PERMIT CENTER
	Applicant Name:	MCKINSTRY COMPANY	
	Applicant Address:	5005 3RD AVE, SOUTH SEATTLE, WA 98124	
	Applicant Phone:	206 762-3311	

Project Description Briefly describe mechanical system type and features.	Three rooftop VAV AC unit serving fan powered terminals via medium pressure duct systems. A constant volume rooftop AC unit serving the elevator machine room. Pressurization system for stair/elevator shafts and garage exhaust.
☑ Includes Plans	Drawings must contain notes requireing compliance with commissioning requirements - Section 1416

Compliance Option	○ Simple System ◉ Complex System ○ Systems Analysis (See Decision Flowchart (over) for qualifications. Use separate MECH-SUM for simple & complex systems.)

Equipment Schedules	The following information is required to be incorporated with the mechanical equipment schedules on the plans. For projects without plans, fill in the required information below.

Cooling Equipment Schedule

Equip. ID	Brand Name[1]	Model No.[1]	Capacity[2] Btu/h	Total CFM	OSA CFM or Econo?	SEER or EER	IPLV[3]	Location
	SEE EQUIPMENT							
	SCHEDULES ON							
	PLANS M1.0							

FILE COPY

I understand that the Plan ... subject ...

Heating Equipment Schedule

Equip. ID	Brand Name[1]	Model No.[1]	Capacity[2] Btu/h	Total CFM	OSA cfm or Econo?	Input Btuh	Output Btuh	Efficiency[4]
	SEE EQUIPMENT							
	SCHEDULES ON							
	PLANS M1.0							

Fan Equipment Schedule

Equip. ID	Brand Name[1]	Model No.[1]	CFM	SP[1]	HP/BHP	Flow Control[5]	Location of Service
	SEE EQUIPMENT						
	SCHEDULES ON						
	PLANS M1.0						

[1]If available. [2] As tested according to Table 14-1A through 14-1G. [3] If required. [4] COP, HSPF, Combustion Efficiency, or AFUE, as applicable. [5] Flow control types: variable air volume(VAV), constant volume (CV), or variable speed (VS).

D03-128

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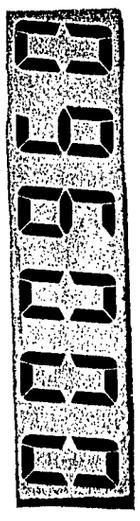
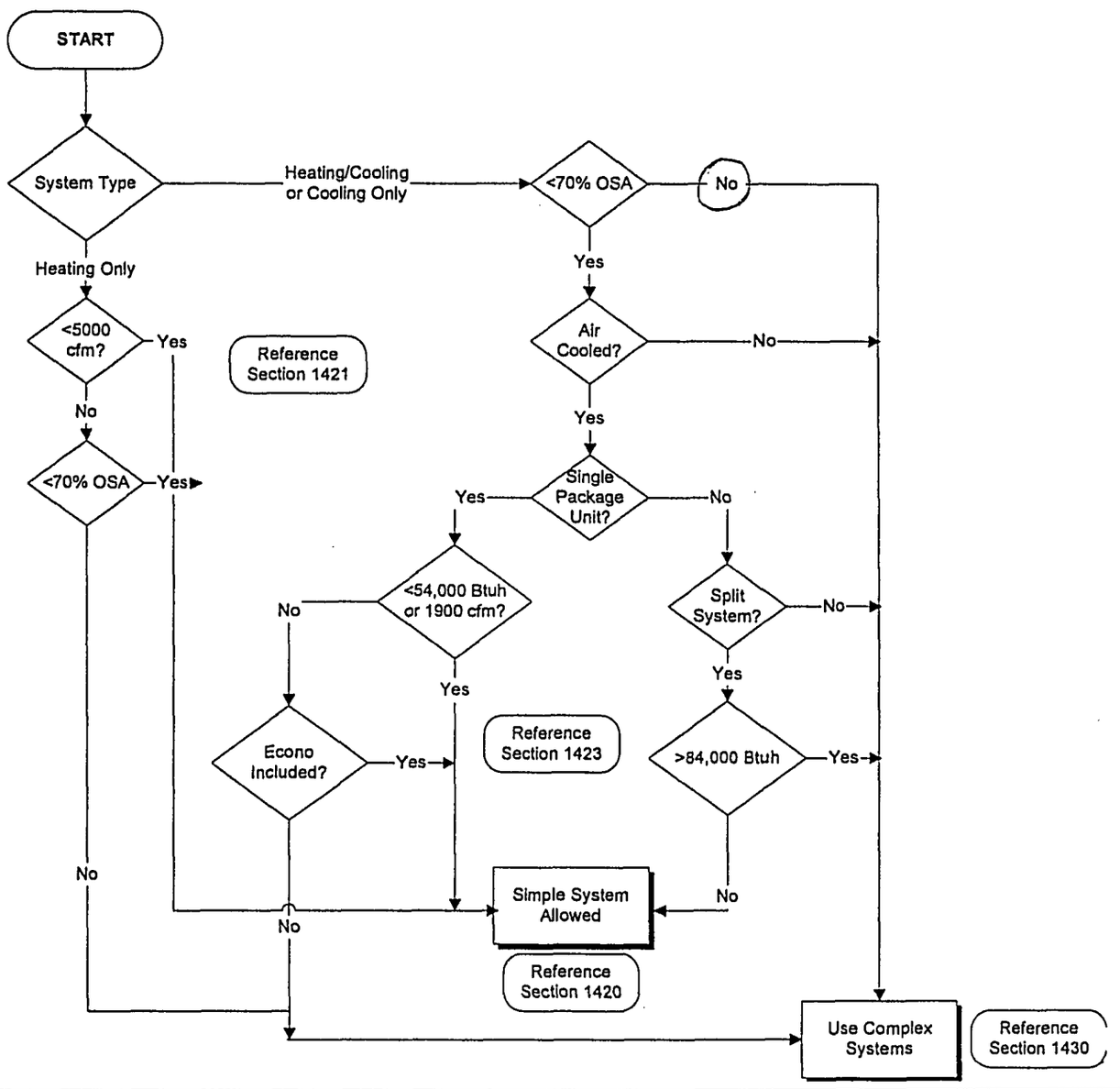


2001 Washington State Nonresidential Energy Code Compliance Form

Mechanical Summary (back) MECH-SUM

System Description See Section 1421 for full description of Simple System qualifications.	If Heating/Cooling or Cooling Only:	☐ Constant vol?	☑ Air cooled?	☑ Packaged sys?	☐ <54,000 Btuh or 1900 cfm?	
		☐ Split system?	☑ Economizer included?			
	If Heating Only:	☐ <5000 cfm?	☐ <70% outside air?			

Decision Flowchart	Use this flowchart to determine if project qualifies for Simple System Option. If not, either the Complex System or Systems Analysis Options must be used.



Complex Systems	Refer to MECH-COMP Mechanical Complex Systems for assistance in determining which Complex Systems requirements are applicable to this project.

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2001 Washington State Nonresidential Energy Code Compliance Form

Mechanical - Complex Systems Checklist — MECH-COMP

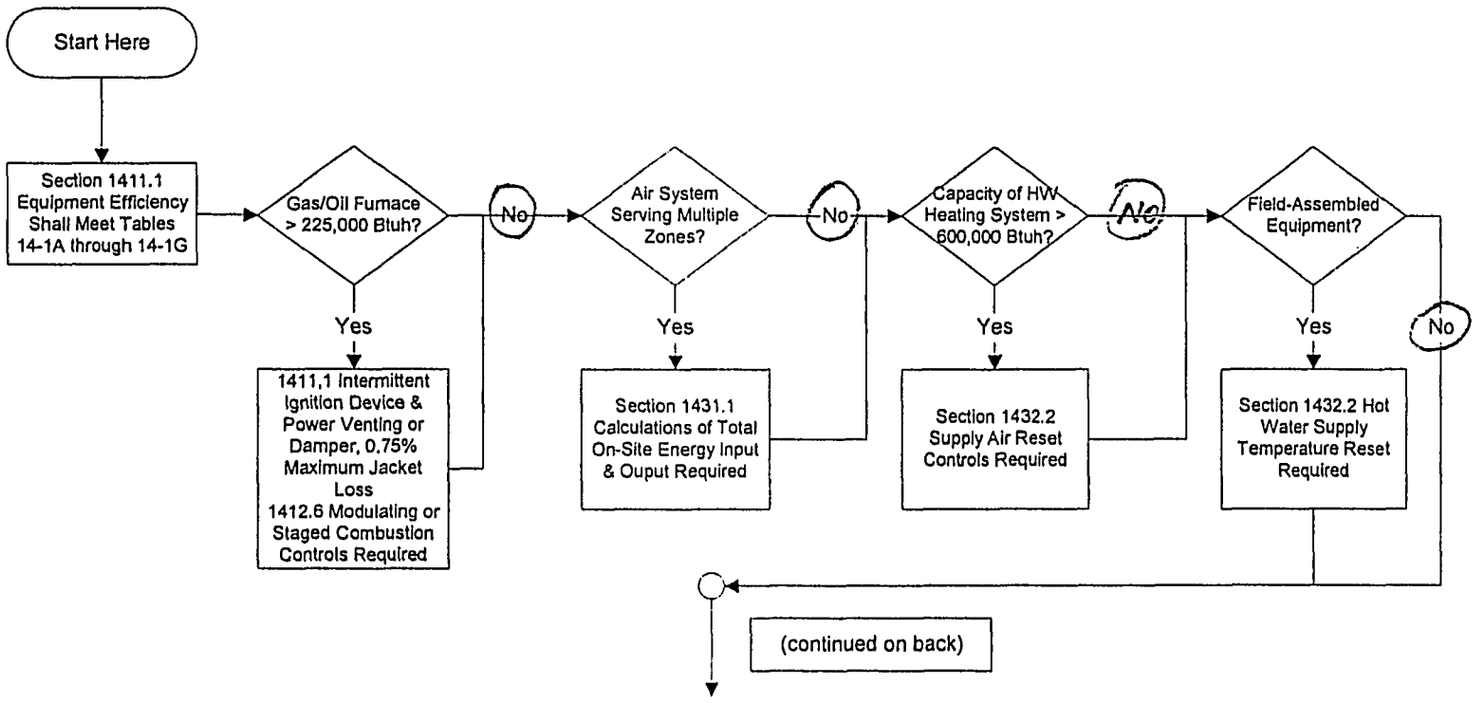
2001 Washington State Nonresidential Energy Code Compliance Forms — June 2002 - KJM

Project Address DEPARTMENT OF HOMELAND SECURITY	Date 4/29/2003
The following additional information is necessary to check a mechanical permit application for a complex mechanical system for compliance with the mechanical requirements in the Washington State Nonresidential Energy Code. Use the checklist as a reference for notes added to the mechanical drawings (see the MECH-CHK checklist for additional system requirements). This information must be on the plans since this is the official record of the permit. Having this information in separate specifications alone is NOT an acceptable alternative.	For Building Department Use

Applicability (yes, no, n.a.)	Code Section	Component	Information Required	Location on Plans	Building Department Notes
ADDITIONAL CHECKLIST ITEMS FOR COMPLEX SYSTEMS ONLY					
n.a.	1431.1	Field assem. sys.	Provide calculations		
yes	1432.1	Setback & shut-off	Indicate separate systems or show isolation devices on plans		
yes	1432.2.1	Air system reset	Indicate automatic reset		
n.a.	1432.2.2	Hydr. system reset	Indicate automatic reset		
yes	1433	Air Economizer	Indicate economizer on equipment schedule or provide calculations to justify exemption		
NA	1433	Water Economizer	Indicate water economizer and provide calculations if 1433 Exception 2 is utilized		
yes	1434	Separate air sys.	Indicate separate systems on plans		
yes	1435	Simul. htg. & clg.	Indicate that simultaneous heating and cooling is prohibited, unless use of exception is justified		
n.a.	1436	Heat recovery	Indicate heat recovery on plans; complete and attach heat recovery calculations		
yes	1437	Elec. motor effic.	MECH-MOT or Equip. Schedule with hp, rpm, efficiency		
yes	1438	Variable flow sys.	Indicate variable flow on fan and pump schedules		
NA	1439.1	Kitchen Hoods	Indicate uncooled and unheated make-up air		
NA	1439.2	Fume Hoods	Indicate VAV, unheated/uncooled or heat rec. makeup		

If "no" is circled for any question, provide explanation:

Decision Flowchart	Use this flowchart to determine how the requirements of the Complex Systems Option apply to the project. Refer to the indicated Code sections for more complete information on the requirements.



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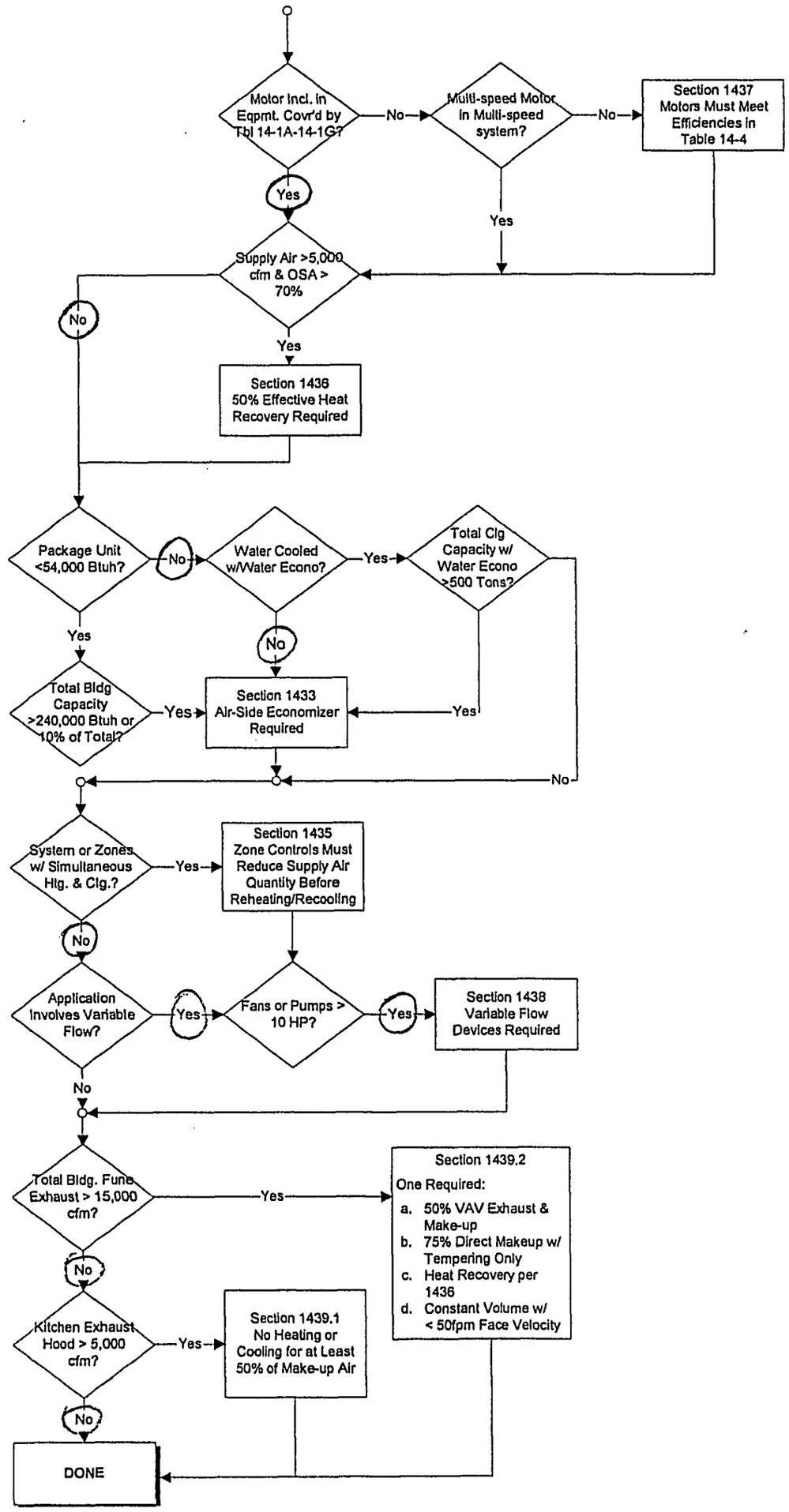
2001 Washington State Nonresidential Energy Code Compliance Form

Mechanical - Complex Systems (back) MECH-COMP

2001 Washington State Nonresidential Energy Code Compliance Forms June 2002 - KJM



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2001 Washington State Nonresidential Energy Code Compliance Form

Electric Motors — MECH-MOT

2001 Washington State Nonresidential Energy Code Compliance Forms — June 2002 - KJM

Project Address	DEPARTMENT OF HOMELAND SECURITY	Date	4/29/2003

Complete the following for all design A & B squirrel-cage, T-frame induction permanently wired polyphase motors from 1 hp to 200 hp having synchronous speeds of 3600, 1800 or 1200 rpm (unless one of the exceptions below applies).

For Building Department Use

Motor No. or Location	HP	Type (open/closed)	Description of Application or Use	Synch. Speed	Min.Nom. Full load Efficiency
VAV Box Terminals See Sheets M1.0	<1		UNDER 1 HP EACH		
AC-1	(2) 30	closed	SUPPLY FAN	1800	PER WSEC
RF-1	30	closed	RELIEF FAN	1800	PER WSEC
AC-2	(2) 30	closed	SUPPLY FAN	1800	PER WSEC
RF-2	30	closed	RELIEF FAN	1800	PER WSEC
AC-3	3	closed	SUPPLY FAN	1800	PER WSEC
AC-3	3/4		RELIEF FAN	1800	PER WSEC
SF-1,2	30 each		ELEVATOR PRESSURIZATION FAN	1800	PER WSEC
SF-3,4	10 each		STAIR PRESSURIZATION FAN	1800	PER WSEC
EF-1 thru 6	10 each		GARAGE EXHAUST FANS	1800	PER WSEC
EF-7	2		TOILET EXHAUST FANS	1800	PER WSEC
EF-8	<1		TOILET EXHAUST FANS	1800	
EF-9 thru 16	<1		ELECTRICAL ROOM VENTILATION FANS		
EF-17	<1		ELECTRICAL ROOM VENTILATION FANS		
EF-18	<1		TOILET EXHAUST FANS	1800	
EF-19	7- 1/2	closed	SALLY PORT EXHAUST	1800	PER WSEC
EF-20	<1	closed	ELEVATOR MACH. ROOM EXHAUST		
EF-21	<1		TOILET EXHAUST FANS		

Minimum Nominal Full-Load Efficiency

	Open Motors			Closed Motors		
Synchronous Speed (RPM)	3,600	1,800	1,200	3,600	1,800	1,200
HP	Efficiency (%)			Efficiency (%)		
1.0	-	82.5	80.0	75.5	82.5	80.0
1.5	82.5	84.0	84.0	82.5	84.0	85.5
2.0	84.0	84.0	85.5	84.0	84.0	86.5
3.0	84.0	86.5	86.5	85.5	87.5	87.5
5.0	85.5	87.5	87.5	87.5	87.5	87.5
7.5	87.5	88.5	88.5	88.5	89.5	89.5
10	88.5	89.5	90.2	89.5	89.5	89.5
15	89.5	91.0	90.2	90.2	91.0	90.2
20	90.2	91.0	91.0	90.2	91.0	90.2
25	91.0	91.7	91.7	91.0	92.4	91.7
30	91.0	92.4	92.4	91.0	92.4	91.7
40	91.7	93.0	93.0	91.7	93.0	93.0
50	92.4	93.0	93.0	92.4	93.0	93.0
60	93.0	93.6	93.6	93.0	93.6	93.6
75	93.0	94.1	93.6	93.0	94.1	93.6
100	93.0	94.1	94.1	93.6	94.5	94.1
125	93.6	94.5	94.1	94.5	94.5	94.1
150	93.6	95.0	94.5	94.5	95.0	95.0
200	94.5	95.0	94.5	95.0	95.0	95.0

Exceptions:

1. Motors in systems designed to use more than one speed of a multi-speed motor.
2. Motors already included in the efficiency requirements for HVAC equipment (Tables 14-1 or 14-2) .
3. Motors that are an integral part (i.e. not easily removed and replaced of specialized process equipment (i.e. equipment which requires a special motor, such as an explosion-proof motor).
4. Motors integral to a listed piece of equipment for which no qualifying motor has been approved (i.e. if the only U.L. listing for the equipment is with a less-efficient motor and there is no energy-efficient motor option).

For motors claiming an exception, list motor and note which exception applies.

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2001 Washington State Nonresidential Energy Code Compliance Form

Mechanical Permit Plans Checklist — MECH-CHK

2001 Washington State Nonresidential Energy Code Compliance Forms — June 2002 - KJM

Project Address	DEPARTMENT OF HOMELAND SECURITY	Date	4/29/2003

The following information is necessary to check a mechanical permit application for compliance with the mechanical requirements in the Washington State Nonresidential Energy Code.

Applicability (yes, no, n.a.)	Code Section	Component	Information Required	Location on Plans	Building Department Notes
HVAC REQUIREMENTS (Sections 1401-1424)					
	1411	**Equipment performance**			
n.a.	1411.4	Pkg. elec. htg.& clg.	List heat pumps on schedule		
yes	1411.1	Minimum efficiency	Equipment schedule with type, capacity, efficiency		
NA	1411.1	Combustion htg.	Indicate intermittent ignition, flue/draft damper & jacket loss		
	1412	**HVAC controls**			
yes	1412.1	Temperature zones	Indicate locations on plans		
yes	1412.2	Deadband control	Indicate 5 degree deadband minimum		
n.a.	1412.3	Humidity control	Indicate humidistat		
yes	1412.4	Automatic setback	Indicate thermostat with night setback and 7 diff. day types		
yes	1412.4.1	Dampers	Indicate damper location and auto. controls & max. leakage		
yes	1412.4.2	Optimum Start	Indicate optimum start controls		
n.a.	1412.5	Heat pump control	Indicate microprocessor on thermostat schedule		
n.a.	1412.6	Combustion htg.	Indicate modulating or staged control		
yes	1412.7	Balancing	Indicate balancing features on plans		
yes	1422	Thermostat interlock	Indicate thermostat interlock on plans		
yes	1423	Economizers	Equipment schedule		
	1413	**Air economizers**			
yes	1413.1	Air Econo Operation	Indicate 100% capability on schedule		
NA	1413.1	Wtr Econo Operation	Indicate 100% capacity at 45 degF db & 40 deg F wb		
n.a.	1413.2	Water Econo Doc	Indicate clg load & water econoe & clg tower performance		
yes	1413.3	Integrated operation	Indicate capability for partial cooling		
NA	1413.4	Humidification	Indicate direct evap or fog atomization w/ air economizer		
	1414	**Ducting systems**			
yes	1414.1	Duct sealing	Indicate sealing necessary		
yes	1414.2	Duct insulation	Indicate R-value of insulation on duct		
n.a.	1415.1	Piping insulation	Indicate R-value of insulation on piping		
	1416	**Completion Requirements**			
yes	1416.1&2	Drawings & Manuals	Indicate requirement for record drawings and operation docs.		
yes	1416.3.2	Air Balancing	Indicate air system balance requirements		
n.a.	1416.3.3	Hydronic Balancing	Indicate hydronic system balance requirements		
yes	1416.4	Commissioning	Indicate requirements for commissioning and prelim. Report		
yes	1424	Separate air sys.	Indicate separate systems on plans		
yes		**Mechanical Summary Form**	Completed and attached. Equipment schedule with types, input/output, efficiency, cfm, hp, economizer		
SERVICE WATER HEATING AND HEATED POOLS (Sections 1440-1454)					
	1440	**Service water htg.**			
yes	1441	Elec. water heater	Indicate R-10 insulation under tank		
yes	1442	Shut-off controls	Indicate automatic shut-off		
YES 4	1443	Pipe Insulation	Indicate R-value of insulation on piping		
NA 4	1452	Heat Pump COP	Indicate minimum COP of 4.0		
NA 4	1452	Heater Efficiency	Indicate pool heater efficiency		
n.a.	1453	Pool heater controls	Indicate switch and 65 degree control		
n.a.	1454	Pool covers	Indicate vapor retardant cover		
n.a.	1454	Pools 90+ degrees	Indicate R-12 pool cover		

If "no" is circled for any question, provide explanation:

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Mechanical Permit Plans Checklist — MECH-CHK

Mechanical - General Requirements

1411.1 General: Equipment shall have a minimum performance at the specified rating conditions not less than the values shown in Table 14-1A through 14-1G. If a nationally recognized certification program exists for a product covered in Tables 14-1A through 14-1G, and it includes provisions for verification and challenge of equipment efficiency ratings, then the product shall be listed in the certification program.

Gas-fired and oil-fired forced air furnaces with input ratings ≥ 225,000 Btu/h (65 kW) shall also have an intermittent ignition or interrupted device (IID), and have either mechanical draft (including power venting) or a flue damper. A vent damper is an acceptable alternative to a flue damper for furnaces where combustion air is drawn from the conditioned space. All furnaces with input ratings ≥ 225,000 Btu/h (65 kW), including electric furnaces, that are not located within the conditioned space shall have jacket losses not exceeding 0.75% of the input rating.

1411.2 Rating Conditions: Cooling equipment shall be rated at ARI test conditions and procedures when available. Where no applicable procedures exist, data shall be furnished by the equipment manufacturer.

1411.3 Combination Space and Service Water Heating: For combination space and service water heaters with a principal function of providing space heat, the Combined Annual Efficiency (CAE) may be calculated by using ASHRAE Standard 124-1991. Storage water heaters used in combination space heat and water heat applications shall have either an Energy FActor (EF) or a CAE of not less than the following:

	EF	CAE
< 50 gal storage	0.58	0.71
50 to 70 gal storage	0.57	0.71
> 70 gal storage	0.55	0.70

1411.4 Packaged Electric Heating and Cooling Equipment: Packaged electric equipment providing both heating and cooling with a total cooling capacity greater than 20,000 Btu/h shall be a heat pump.

Exception: Unstaffed equipment shaelters or cabinets used solely for personal wireless service facilities.

1412 Controls

1412.1 Temperature Controls: Each system shall be provided with at least one temperature control device. Each zone shall be controlled by individual thermostatic controls responding to temperature within the zone. At a minimum, each floor of a building shall be considered as a separate zone.

1412.2 Deadband Controls: When used to control both comfort heating and cooling, zone thermostatic controls shall be capable of a deadband of at least 5 degrees F within which the supply of heating and cooling energy to the zone is shut off or reduced to a minimum.

Exceptions:

1. Special occupancy, special usage, or code requirements where deadband controls are not appropriate.
2. Buildings complying with Section 1141.4, if in the proposed building energy analysis, heating and cooling thermostat setpoints are set to the same temperature between 70 degrees F and 75 degrees F inclusive, and assumed to be constant throughout the year.
3. Thermostats that require manual changeover between heating and cooling modes.

1412.3 Humidity Controls: If a system is equipped with a means for adding moisture, a humidistat shall be provided.

1412.4 Setback and Shut-Off: HVAC systems shall be equipped with automatic controls capable of accomplishing a reduction of energy use through control setback or equipment shutdown during periods of non-use or alternate use of the spaces served by the system. The automatic controls shall have a minimum seven-day clock and be capable of being set for seven different day types per week.

Exceptions:

1. Systems serving areas which require continuous operation at the same temperature setpoint.
2. Equipment with full load demands of 2 kW (6,826 Btu/h) or less may be controlled by readily accessible manual off-hour controls.

1412.4.1 Dampers: Outside air intakes, exhaust outlets and relief outlets serving conditioned spaces shall be equipped with dampers which close automatically when the system is off or upon power failure.

Exceptions:

1. Systems serving areas which require continuous operation.
2. Combustion air intakes.
3. Gravity (nonmotorized) dampers are acceptable in buildings less than 3 stories in height.
4. Gravity (nonmotorized) dampers are acceptable in exhaust and relief outlets in the first story and levels below the first story of buildings three or more stories in height.

1412.4.2 Optimum Start Controls: Heating and cooling systems with design supply air capacities exceeding 10,000 cfm shall have optimum start controls. Optimum start controls shall be designed to automatically adjust the start time of an HVAC system each day to bring the space to desired occupied temperature levels immediately before scheduled occupancy. The control algorithm shall, as a minimum, be a function of the difference between space temperature and occupied setpoint and the amount of time prior to scheduled occupancy.

1412.5 Heat Pump Controls: Unitary air cooled heat pumps shall include microprocessor controls that minimize supplemental heat usage during start-up, set-up, and defrost conditions. These controls shall anticipate need for heat and use compression heating as the first stage of heat. Controls shall indicate when supplemental heating is being used through visual means (e.g., LED indicators).

1412.6 Combustion Heating Equipment Controls: Combustion heating equipment with a capacity over 225,000 Btu/h shall have modulating or staged combustion control.

Exceptions:

1. Boilers.
2. Radiant Heaters.

1412.7 Balancing: Each air supply outlet or air or water terminal device shall have a means for balancing, including but not limited to, dampers, temperature and pressure test connections and balancing valves.

1413 Air Economizers

1413.1 Operation: Air economizers shall be of automatically modulating outside and return air dampers to provide 100 percent of the design supply air as outside air to reduce or eliminate the need for mechanical cooling. Water economizers shall be capable of providing the total concurrent cooling load served by the conneted terminal equipment lacking airside economizer, at outside air temperatures of 45°F dry-bulb/40°F wet-bulb and below. For this calculation, all factors including solar and internal load shall be the same as those used for peak load calculations, except for the outside temperatures.

Exception: Water economizers using air-cooled heat rejection equipment may use a 35°F dry-bulb outside air temperature for this calculation. This exception is limited to a maximum of 20 tons per building.

1413.2 Documentation: Water economizer plans submitted for approval shall include the following information:

1. Maximum outside air conditions for which economizer is sized to provide full cooling.
2. Design cooling load to be provided by economizer at this outside air condition.
3. Heat rejection and terminal equipment performance data including model number, flow rate, capacity, entering and leaving temperature in full economizer cooling mode.

1413.3 Integrated Operation: Air economizers shall be capable of providing partial cooling even when additional mechanical cooling is required to meet the remainder of the cooling load.

Exceptions:

1. Individual, direct expansion units that have a rated capacity less than 65,000 Btu/h and use nonintegrated economizer controls that preclude simultaneous operation of the economizer and mechanical cooling.
2. Water-cooled water chillers.

1414 Ducting Systems

1414.1 Sealing: Duct work which is designed to operate at pressures above 1/2 inch water column static pressure shall be sealed in accordance with Standard RS-18. Extent of sealing required is as follows:

1. Static pressure: 1/2 inch to 2 inches; seal transverse joints.
2. Static pressure: 2 inches to 3 inches; seal all transverse joints and longitudinal seams.
3. Static pressure: above 3 inches; seal all transverse joints, longitudinal seams and duct wall penetrations.

Duct tape and other pressure sensitive tape shall not be used as the primary sealant where ducts are designed to operate at static pressures of 1 inch W.C. or greater.

1414.2 Insulation: Ducts and plenums that are constructed and function as part of the building envelope, by separating interior space from exterior space, shall meet all applicable requirements of Chapter 13. These requirements include insulation installation, moisture control, air leakage, and building envelope insulation levels. Unheated equipment rooms with combustion air louvers must be isolated from the conditioned space by insulating interior surfaces to a minimum of R-11 and any exterior envelope surfaces per Chapter 13. Outside air ducts serving individual supply air units with less than 2,800 cfm of total supply air capacity shall be insulated to a minimum of R-7 and are not considered building envelope. Other outside air duct runs are considered building envelope until they,

1. connect to the heating or cooling equipment, or
2. are isolated from the exterior with an automatic shut-off damper complying with Section 1412.4.1.

Once outside air ducts meet the above listed requirements, any runs within conditioned space shall comply with Table 14-5 requirements.

Other ducts and plenums shall be thermally insulated per Table 14-5.

Exceptions:

1. Within the HVAC equipment.
2. Exhaust air ducts not subject to condensation.
3. Exposed ductwork within a zone that serves that zone.

1415 Piping Systems

1415.1 Insulation: Piping shall be thermally insulated in accordance with Table 14-6.

Exception: Piping installed within unitary HVAC equipment.

Water pipes outside the conditioned space shall be insulated in accordance with Washington State Plumbing Code (WAC 51-26)

1416 Completion Requirements *(Refer to NREC Section 1416 and the Building Commissioning Guidelines, published by the Building Commissioning Association, for complete text and guidelines for building completion and commissioning requirements.)*

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2001 Washington State Nonresidential Energy Code Compliance Form

Envelope Summary — Climate Zone 1 — ENV-SUM

2001 Washington State Nonresidential Energy Code Compliance Forms — Revised June 2002 KJM

Project Info			Date	4/29/2003
	Project Address	DEPARTMENT OF HOMELAND SECURITY	For Building Department Use	RECEIVED CITY OF TUKWILA APR 3 0 2003 PERMIT CENTER
		12500 TUKWILA INTERNATIONAL BLVD.		
		SEATTLE, WASHINGTON		
	Applicant Name:	MCKINSTRY COMPANY		
	Applicant Address:	5005 3RD AVE, SOUTH SEATTLE, WA 98124		
	Applicant Phone:	206 762-3311		

Project Description ☑ New Building ☐ Addition ☐ Alteration ☐ Change of Use

Compliance Option ☐ Prescriptive ☑ Component Performance (See Decision Flowchart (over) for qualifications) ☐ ENVSTD 2.1 (4.0 not acceptable) ☐ Systems Analysis

Space Heat Type ○ Electric resistance ◉ All other (see over for definitions)

Glazing Area Calculation
Note: Below grade walls may be included in the Gross Exterior Wall Area if they are insulated to the level required for opaque walls.

Electronic version: these values are automatically taken from ENV-UA-1.

Total Glazing Area (rough opening) (vertical & overhd)		Gross Exterior Wall Area		% Glazing
	divided by		times 100 equals	
17572.0	÷	49658.0	X 100 =	35.4%

Concrete/Masonry Option ○ yes ◉ no Check here if using this option and if project meets all requirements for the Concrete/Masonry Option. See Decision Flowchart (over) for qualifications. Enter requirements for each qualifying assembly below.

Envelope Requirements (enter values as applicable)	
Fully heated/cooled space	
	Minimum Insulation R-values
Roofs Over Attic	
All Other Roofs	21.0
Opaque Walls[1]	11.0
Below Grade Walls	
Floors Over Unconditioned Space	19.0
Slabs-on-Grade	
Radiant Floors	
	Maximum U-factors
Opaque Doors	
Vertical Glazing	
Overhead Glazing	
	Maximum SHGC (or SC)
Vertical/Overhead Glazing	

Semi-heated space [2]	
	Minimum Insulation R-values
Roofs Over Semi-Heated Spaces[2]	

1. Assemblies with metal framing must comply with overall U-factors
2. Refer to Section 1310 for qualifications and requirements

Opaque Concrete/Masonry Wall Requirements	
Insulation on interior - maximum U-factor is 0.19	
Insulation on exterior or integral - maximum U-factor is 0.25	
If project qualifies for Concrete/Masonry Option, list walls with HC ≥ 9.0 Btu/ft²·°F below (other walls must meet Opaque Wall requirements). Use descriptions and values from Table 20-5b in the Code.	
Wall Description (including insulation R-value & position)	**U-factor**

Notes:

D03-128

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2001 Washington State Nonresidential Energy Code Compliance Form

Envelope UA Calculations Climate Zone1 ENV-UA

2001 Washington State Nonresidential Energy Code Compliance Forms

Revised June 2002 KJM

Project Address	DEPARTMENT OF HOMELAND SECURITY		Date 4/29/2003
Space Heat Type	○ Electric resistance	◉ All other	For Building Department Use
Glazing Area as % gross exterior wall area	35.4% Prop.	40.0% Max.Target	
Concrete/Masonry Option	○ Yes	◉ No	

Notes: If glazing area exceeds maximum allowed in Table, then calculate adjusted areas on back (over). If Concrete/Masonry Option is used, Target U-factors, SHGC and Glazing % will be different than shown below. Refer to Table 13-1 for correct values.

	Building Component List components by assembly ID & page #		Proposed UA U-factor	 x Area (A)	 = UA (U x A)	Target UA U-factor	 x Area (A)	 = UA (U x A)
Vertical Glazing	U=	Plan ID:	0.500	17572.0	8786.0	0.500	17572.0	8786.0
	U=	Plan ID:				Glazing %	Electric Resist.	Other Heating
	U=	Plan ID:				0-15%	0.40	0.90
	U=	Plan ID:				>15-20%	0.40	0.75
	U=	Plan ID:				>20-30%	see note above	0.60
	U=	Plan ID:				>30-40%	see note above	0.50
	U=	Plan ID:				(see Table 13-1 for Conc/Masonry values)		
Overhead Glazing: Over Attics	U=	Plan ID:						
	U=	Plan ID:				Glazing %	Electric Resist.	Other Heating
	U=	Plan ID:				0-15%	0.80	1.45
	U=	Plan ID:				>15-20%	0.80	1.40
Overhead Glazing: Oth.Roofs	U=	Plan ID:				>20-30%	see note above	1.30
	U=	Plan ID:				>30-40%	see note above	1.25
	U=	Plan ID:				(see Table 13-1 for Conc/Masonry values)		
	U=	Plan ID:						
Opaque Doors	U=	Plan ID:	0.600	180.0	108.0	0.600	180.0	108.0
	U=	Plan ID:					Electric Resist.	Other Heating
	U=	Plan ID:					0.60	0.60
Roofs Over Attics	R=	Plan ID:						
	R=	Plan ID:					Electric Resist.	Other Heating
	R=	Plan ID:					0.031	0.036
Other Roofs	R=	Plan ID:	0.050	36210.0	1810.5	0.050	36210.0	1810.5
	R=	Plan ID:					Electric Resist.	Other Heating
	R=	Plan ID:					0.034	0.050
Opaque Walls*	R=	Plan ID:	0.140	31906.0	4466.8	0.140	31906.0	4466.8
	R=	Plan ID:				**		
	R=	Plan ID:				**		
	R=	Plan ID:					Electric Resist.	Other Heating
	R=	Plan ID:				Ordinary	0.062	0.14
	R=	Plan ID:				Conc(int)	0.19	0.19
	R=	Plan ID:				Conc(oth)	0.25	0.25
	**Note: sum of Target Areas here should equal Target Opaque Wall Area (see back)							
Below Grade Walls	R=	Plan ID:						
	R=	Plan ID:					Electric Resist.	Other Heating
	R=	Plan ID:					0.062	0.14
	Note: if insulated to levels required for opaque walls, list above with opaque walls							
Floors Over Unheated	R=	Plan ID:	0.048	41578.0	1995.7	0.056	41578.0	2328.4
	R=	Plan ID:					Electric Resist.	Other Heating
	R=	Plan ID:					0.029	0.056
	R=	Plan ID:						
Slab-on-grade Radiant	R=	Plan ID:						
	R=	Plan ID:					Electric Resist.	Other Heating
	R=	Plan ID:					F=0.54	F=0.54
	R=	Plan ID:				(see Table 13-1 for radiant floor values)		
	Totals		127446.0	17167.1		Totals	127446.0	17499.7

*For CMU walls, indicate core insulation material.

For compliance:

1) Proposed Total Area shall equal Target Total Area, and 2) Proposed Total UA shall not exceed Target Total UA.

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2001 Washington State Nonresidential Energy Code Compliance Form

Climate Zone 1 ENV-SHGC

2001 Washington State Nonresidential Energy Code Compliance Forms — Revised June 2002 KJM

	Glazing List components by assembly ID & page #	Proposed SHGC SHGC*	x Area (A)	= SHGC x A	Target SHGC SHGC	x Area (A)	= SHGC x A
Glazing	ID:	0.450	17572.0	7907.4	0.450	17572.0	7907.4
	ID:				Glazing %	Electric Resist.	Other Heating
	ID:				0-20%	1.00	1.00
	ID:				>20-30%	not allowed	0.65
	ID:				>30-40%	not allowed	0.45
	ID:				(see Table 13-1 for Conc/Masonry values)		
*Note: Manufacturer's SC may be used in lieu of SHGC.	Totals	17572.0	7907.4		Totals	17572.0	7907.4

For compliance: Proposed total SHGC x A shall not exceed Target total SHGC x A

NOTE: Since 1997 SHGC compliance for vertical and overhead glazing is allowed to be calculated together.

Target Area Adjustment Calculations

If the total amount of glazing area as a % of gross exterior wall area (calculated on ENV-SUM1) exceeds the maximum allowed in Table 13-1, then this calculation must be submitted Use the resulting areas in the Target UA and SHGC calculations above.

Proposed Areas: Numbered values are used in calculations below.

	Roofs over Attics	Other Roofs	Walls
Glazing Area	OG=	OG=	VG= 17572.0
Opaque Area		36210.0	31906.0

Note:
OG = overhead glazing
VG = vertical glazing

Gross Exterior Wall Area: 49658.0 × Max Glazing Area (Table 13-1): 40.0% ÷ 100 = Maximum Target Glazing Area: 19863.2

Target OG Area in Roofs over Attics: 19863.2 − ⇕ lesser 19863.2 = Max OG Remaining: 19863.2

Target OG Area in Other Roofs: 19863.2 − ⇕ lesser 19863.2 = Target VG Area: 17572.0

For Target OG's, the lesser values are used both here and below.

	Proposed Opaque Area	+	Proposed OG Area	−	Target OG Area	=	Target Opaque Area
Roofs over Attics		+		−		=	
Other Roofs	36210.0	+		−		=	36210.0

	Proposed Opaque Area	+	Proposed VG Area	−	Target VG Area	=	Target Opaque Area	
Walls	31906.0	+	17572.0	−	17572.0	=	31906.0	Target Areas OK

Note: If there is more than one type of wall, the Target VG Area may be distributed among them, and separate Target Opaque Areas found.
If the Target Areas for Opaque Walls listed on the front must equal the total calculated here.

Target values in shaded boxes are used in the applicable Target UA calculations on the front.
Target VG Area and Total Target OG Area are also used in the applicable Target SHGC calculations above.

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2001 Washington State Nonresidential Energy Code Compliance Form

Lighting Summary — LTG-SUM

2001 Washington State Nonresidential Energy Code Compliance Forms — Revised June 2002 - KJM

Project Info			
Project Address	12500 TUKWILA INTERNATIONAL BLVD	Date	4/29/2003
	OFFICE BUILDING	For Building Department Use	RECEIVED CITY OF TUKWILA APR 3 0 2003 PERMIT CENTER
	SEATTLE, WA 98168		
Applicant Name:	SABEY CORPORATION		
Applicant Address:	12201 TUKWILA INTL BLVD, SEATTLE, WA 98168		
Applicant Phone:	206-281-8700		

Project Description

☑ New Building ☐ Addition ☐ Alteration ☐ Plans Included

Refer to WSEC Section 1513 for controls and commissioning requirements.

Compliance Option

○ Prescriptive ◉ Lighting Power Allowance ○ Systems Analysis

(See Qualification Checklist (over). Indicate Prescriptive & LPA spaces clearly on plans.)

Alteration Exceptions (check appropriate box)

☐ No changes are being made to the lighting

☐ Less than 60% of the fixtures are new, and installed lighting wattage is not being increased

Maximum Allowed Lighting Wattage (Interior)

Location (floor/room no.)	Occupancy Description	Allowed Watts per ft² **	Area in ft²	Allowed x Area
LEVELS 1-4	OFFICE	1.20	135532.0	162638.4
LEVELS P1, P2, P3	STORAGE/COMMON	0.80	11174.0	8939.2
** From Table 15-1 (over) - document all exceptions on form LTG-LPA			Total Allowed Watts	171577.6

FILE COPY

I understand that ...

Notes:
1. Use manufacturer's listed maximum input wattage. For hard-wired ballasts only, the default table in the NREC Technical Reference Manual may also be used
2. Include exit lights unless less than 5 watts per fixture.
3. List all fixtures. For exempt lighting, not exception and leave Watts/Fixture blank.

Proposed Lighting Wattage (Interior)

Location (floor/room no.)	Fixture Description	Number of Fixtures	Watts/ Fixture	Watts Proposed
	2X4 3-LAMP PARABOLIC	1245	91.0	113295.0
	1X4 2-LAMP FLUORESCENT UTILITY FIXTURE	203	61.0	12383.0
	6" DOWNLIGHT 1-32W PL LAMP	12	32.0	384.0
	8" DOWNLIGHT 2-32W PL LAMPS	158	64.0	10112.0
	DECORATIVE PENDANT LOBBY FIXTURE	3	300.0	900.0
Total Proposed Watts may not exceed Total Allowed Watts for Interior			Total Proposed Watts	137074.0

Maximum Allowed Lighting Wattage (Exterior)

Location	Description	Allowed Watts per ft² or per lf	Area in ft² (or lf for perimeter)	Allowed Watts x ft² (or x lf)
Covered Parking (standard paint)	PARKING LEVELS P1, P2, P3	0.2 W/ft²	114507.0	22901.4
Covered Parking (reflective paint)		0.3 W/ft²		
Open Parking	EXTERIOR OFFICE BUILDING PARKING	0.2 W/ft²	82504.0	16500.8
Outdoor Areas	OFFICE BUILDING OUTDOOR AREAS	0.2 W/ft²	113387.0	22677.4
Bldg. (by facade)		0.25 W/ft²		
Bldg. (by perim)		7.5 W/lf	674.0	5055.0
Note: for building exterior, choose either the facade area or the perimeter method, but not both)			Total Allowed Watts	67134.6

Proposed Lighting Wattage (Exterior)

Use mfgr listed maximum input wattage. For fixtures with hard-wired ballasts only, the default table in the NREC Technical Reference Manual may also be used.

Location	Fixture Description	Number of Fixtures	Watts/ Fixture	Watts Proposed
Covered Parking	1X4 SURFACE FLUORESCENT	30	61.0	1830.0
Covered Parking	175 MH SURFACE HID FIXTURE	133	215.0	28595.0
Open Parking	400 MH POLE FIXTURE	24	465.0	11160.0
Outdoor Areas	175 MH 15 FT POLE FIXTURE	10	215.0	2150.0
Outdoor Areas	100 MH MINI CUT-OFF WALL PACK	24	129.0	3096.0
Building Perimeter	100 MH DOWNLIGHT	17	129.0	2193.0
Building Perimeter	SECURITY FLUOR FIXTURE	8	32.0	256.0
Total Proposed Watts may not exceed Total Allowed Watts for Exterior			Total Proposed Watts	49280.0

D03-128

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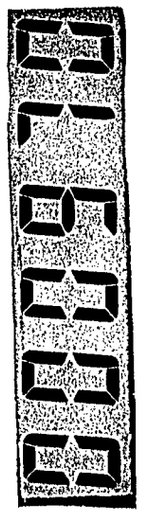

2001 Washington State Nonresidential Energy Code Compliance Form

Lighting Summary (back) LTG-SUM

2001 Washington State Nonresidential Energy Code Compliance Forms — Revised June 2002 - KJM

Prescriptive Spaces	Occupancy:	○ Warehouses, storage areas or aircraft storage hangers ◉ Other
Qualification Checklist Note: If occupancy type is "Other" and fixture answer is checked, the number of fixtures in the space is not limited by Code. Clearly indicate these spaces on plans. If not qualified, do LPA Calculations.	Lighting Fixtures:	☐ Check here if at least 95% of fixtures in the space meet all four criteria: 1. Fixtures are fluorescent, non-lensed, with only one or two lamps, and 2. Lamps are T-1, T-2, T-4, T-5, T-6, T-8 3. Lamps are 5-50 Watts, and 4. Ballasts are electronic ballasts 5. Exit lights < 5 watts/fixture 6. Screw-in compact fluorescent fixtures do not qualify

TABLE 15-1 Unit Lighting Power Allowance (LPA)

Use[1]	LPA[2] (W/sf)	Use[1]	LPA[2] (W/sf)
Painting, welding, carpentry, machine shops	2.3	Police and fire stations[5]	1.5
Barber shops, beauty shops	2.0	Atria (atriums)	1.0
Hotel banquet/conference/exhibition hall[3,4]	2.0	Assembly spaces[9], auditoriums, gymnasia[9], heaters	1.0
Laboratories	2.0	Group R-1 common areas	1.0
Aircraft repair hangars	1.5	Process plants	1.0
Cafeterias, fast food establishments[5]	1.5	Restaurants/bars[5]	1.0
Factories, workshops, handling areas	1.5	Locker and/or shower facilities	0.8
Gas stations, auto repair shops[6]	1.5	Warehouses[11], storage areas	0.5
Institutions	1.5	Aircraft storage hangars	0.4
Libraries[5]	1.5	Retail[10], retail banking	1.5
Nursing homes and hotel/motel guest rooms	1.5	Parking garages	See Section 1532
Wholesale stores (pallet rack shelving)	1.5		
Mall concourses	1.4	**Plans Submitted for Common Areas Only[7]**	
Schools buildings (Group E occupancy only), school classrooms, day care centers	1.35	Main floor building lobbies[7] (except mall concourses)	1.2
Laundries	1.3	Common areas, corridors, toilet facilities and washrooms, elevator lobbies	0.8
Office buildings, office/administrative areas in facilities of other use types (including but not limited to schools, hospitals, institutions, museums, banks, churches)[5,7,11]	1.2		

Footnotes for Table 15-1

1) In cases in which a general use and a specific use are listed, the specific use shall apply. In cases in which a use is not mentioned specifically, the Unit Power Allowance shall be determined by the building official. This determination shall be based upon the most comparable use specified in the table. See Section 1512 for exempt areas.
2) The watts per square foot may be increased, by two percent per foot of ceiling height above twenty feet, unless specifically directed otherwise by subsequent footnotes.
3) Watts per square foot of room may be increased by two percent per foot of ceiling height above twelve feet.
4) For all other spaces, such as seating and common areas, use the Unit Light Power Allowance for assembly.
5) Watts per square foot of room may be increased by two percent per foot of ceiling height above nine feet.
6) Includes pump area under canopy.
7) In cases in which a lighting plan is submitted for only a portion of a floor, a Unit Lighting Power Allowance of 1.35 may be used for usable office floor area and 0.80 watts per square foot shall be used for the common areas, which may include elevator space, lobby area and rest rooms. Common areas, as herein defined do not include mall concourses.
8) For the fire engine room, the Unit Lighting Power Allowance is 1.0 watts per square foot.
9) For indoor sport tournament courts with adjacent spectator seating, the Unit Lighting Power Allowance for the court area is 2.6 watts per square foot.
10) Display window illumination installed within 2 feet of the window, lighting for free-standing display where the lighting moves with the display, and building showcase illumination where the lighting is enclosed within the showcase are exempt.

    An additional 1.5 w/ft^2 of merchandise display luminaires are exempt provided that they comply with all three of the following:

    a) located on ceiling-mounted track or directly on or recessed into the ceiling itself (not on the wall).
    b) adjustable in both the horizontal and vertical axes (vertical axis only is acceptable for fluorescent and other fixtures with two points of track attachment).
    c) fitted with tungsten halogen, fluorescent, or high intensity discharge lamps.

    This additional lighting power is allowed only if the lighting is actually installed.
11) Provided that a floor plan, indicating rack location and height, is submitted, the square footage for a warehouse may be defined, for computing the interior Unit Lighting Power Allowance, as the floor area not covered by racks plus the vertical face area (access side only) of the racks. The height allowance defined in footnote 2 applies only to the floor area not covered by racks.

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ype	Mfg	Catalog No.	Description	Lamp	Watts
		DHS SEATTLE DISTRICT OFFICE			4/30/03
\	LITHONIA	2PM2 G B 3 32 18LD 277 GEB	2X4 3-LAMP PARABOLIC TROFFER	(3) FO32T8-835	91
G	GARDCO	QUADRA GP1-175MH-277	GARAGE 175MH HID CEILING MOUNT	175MH	210
H4	LITHONIA	UN 2 32 277 ES WGCUN	2 LAMP STRIP 4FT WITH WIREGUARD	(2) FO32T8-835	61
H8	LITHONIA	UN 2 32 277 ES WGCUN	4 LAMP STRIP 8FT WITH WIREGUARD	(4) FO32T8-835	122
		DECORATIVE LOBBY LIGHT		TBD	300
K4	LITHONIA	NAT F 2 32 203LD 277 GEB	RECESSED LOUVERED 4 FT FLUORESCENT	(2) FO32T8-835	61
K8	LITHONIA	TCNAT F 4 32 203LD 277 GEB	RECESSED LOUVERED 8 FT FLUORESCENT	(4) FO32T8-835	122
M	LITHONIA	AF 1/32TRT 6AR 277 BH24	6" COMPACT FLUOR DOWNLIGHT WITH T-BAR HANGERS	32TRT	32
M8	LITHONIA	AF 2/32TRT 8AR 277 BH24	8" COMPACT FLUOR DOWNLIGHT WITH T-BAR HANGERS	(2) 32TRT	64
M8W	LITHONIA	AFW 2/32TRT 8AR 277 BH24	8" COMPACT FLUOR WALLWASH WITH T-BAR HANGERS	(2) 32TRT	64
MW	LITHONIA	AFW 1/32TRT 6AR 277 BH24	6" COMPACT FLUOR WALLWASH WITH T-BAR HANGERS	32TRT	32
P	LITHONIA	WC 2 32 A12 277 GEB	STAIRWELL 4FT WALL MT	(2) FO32T8-835	61
P1	LITHONIA	WC 2 32 A12 120 GEB	ELEVATOR PIT 4FT WALL MT	(2) FO32T8-835	61
P8	LITHONIA	TCS 4 32 277 GEB	CEILING MOUNT LENSED FIXTURE 8FT	(4) FO32T8-835	122
P81	LITHONIA	TCS 4 32 120 GEB	CEILING MOUNT LENSED FIXTURE 8FT - ELEV	(4) FO32T8-835	122
PE	LITHONIA	WC 2 32 A12 277 GEB EL	STAIRWELL 4FT WALL MT W/ BATT BACKUP	(2) FO32T8-835	62
Q	LITHONIA	LGHZ 100M 7RW 277	ARCH 100MH DWN LT W/ FRESNAL LENS WET LOCATION	MH100/C/U/MED	129
SA	LITHONIA	KAD 400M R4 277 DAD12P DDB	400W MH WITH R4 DIST ON 20 FT POLE, 12 DEG TILT	400MH	465
SA3	LITHONIA	KAD 400M R4 240 DDB	400W MH WITH R4 DIST ON 30 FT POLE 240V	400MH	465
SG	LITHONIA	KAD 400M R3 277 DAD12P DDB	400W MH WITH R3 DIST ON 20 FT POLE, 12 DEG TILT	400MH	465
SK	LITHONIA	KAD 150S R3 277 SPD04 DDB	175W MH WITH R3 DIST ON 15 FT POLE	175MH	210
SL	LITHONIA	9350 D A 100M 120 SP JBA01 AS TVG	WELL LIGHT FOR ILLUMINATION OF FLAGPOLE	MH100	129
SM	LITHONIA	WFL2 175M FT	ARCH WALL PACK, 5 DEG TILT	175MH	210
SP	LITHONIA	WFL2 100M RM	ARCH WALL PACK, UPLIGHT	MH100	129
SQ	LITHONIA	WFL2 175M FT	ARCH WALL PACK, UPLIGHT	MH175	210
SS	LITHONIA	TWAC 100M 277 DMB LPI	CUT-OFF MINI WALL PACK	100M INCL	129
V	LITHONIA	VR2V 32 TRT 277 LPI	WALL MOUNT SECURITY LIGHT	32TRT INCL	32
	LITHONIA	LQM-S-W-3-G-120/277	UNIV EXIT W/O BATTERY	LED	
X1	LITHONIA	LHQM-S-W-3-G-120/277	UNIV EXIT W/ BATTERY AND EMERGENCY EGRESS LT	LED, INC	
X2	LITHONIA	LQM-S-W-3-G-120/277-EL-N	UNIV EXIT W/ BATTERY	LED	

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PLEASE

A

Catalog Number	
Notes	Type

FEATURES

- Choice of low iridescent diffuse or specular louver finishes. Also available with new Achroma™ non-iridescent louver finish.
- Lensed versions also available featuring aluminum door frames and a variety of flat shielding.
- Black reveal provides floating louver appearance, conceals optional air-supply slots.
- Optional heat-removal dampers and air-pattern control blades allow airflow control.
- Overlapping flange and modular ceiling trims factory installed with standard swing-gate hangers or field convertible with optional trim and hanger kits.
- T-hinges die-formed for maximum strength. Latches spring-loaded, concealed in reveal.
- Guaranteed for one year against mechanical defects in manufacture.

SPECIFICATIONS

BALLAST — Thermally-protected, resetting, Class P, HPF, non-PCB, UL listed, CSA certified ballast is standard. Energy-saving and electronic ballasts are sound rated A. Standard combinations are CBM approved and conform to UL 935.

WIRING & ELECTRICAL — Fixture conforms to UL 1570 and is suitable for damp locations. AWM, TFN or THHN wire used throughout, rated for required temperatures.

MATERIALS — Housing formed from cold-rolled steel. Louvers formed from premium-grade aluminum lighting sheet. No asbestos is used in this product.

FINISH — Five-stage iron-phosphate pretreatment ensures superior paint adhesion and rust resistance. Painted parts finished with high-gloss, baked white enamel.

LISTING — UL listed and labeled. Listed and labeled to comply with Canadian and Mexican Standards (see Options).

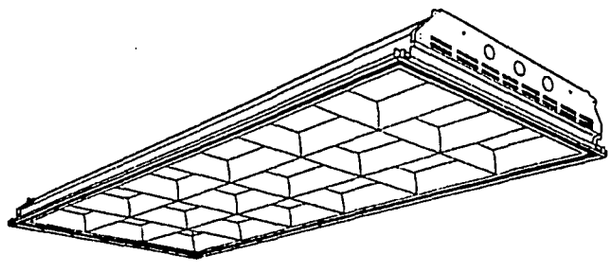
Specifications subject to change without notice.

PARAMAX® Parabolic Troffer

PM2 2'x4'

2" Deep Louver

3 Lamps



ENERGY

Luminaire Efficacy Rating (LER) and Annual Energy Cost/1000 Lumens:

3-lamp LER.FP (LD louver) = 65. Annual energy cost = $3.69
Based on 32W T8 lamp, 2850-lumen lamp and electronic ballast.
Ballast factor = .88, input watts = 86.

Calculated in accordance with NEMA standard LE-5.

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PHOTOMETRICS

Calculated using the zonal cavity method in accordance with IESNA LM41 procedures. Floor reflectances are 20%. Lamp configurations shown are typical. Full photometric data on these and other configurations available upon request.

2PM2 G B 3 32 18LD
Report LTL 5233 - Lumens per lamp = 2900
S/MH (along) 1.2 (across) 1.6

Coefficient of Utilization

Ceiling	80%			70%			50%			0%
Wall	70%	50%	30%	70%	50%	30%	50%	30%	10%	0%
0	89	89	89	87	87	87	83	83	83	74
1	83	80	78	81	79	76	76	74	72	66
2	77	72	68	75	71	67	69	66	63	59
3	72	65	60	70	64	60	62	58	55	52
4	66	59	53	64	58	52	56	51	48	45
5	61	52	46	59	51	46	50	45	41	39
6	56	47	41	55	46	41	45	40	36	34
7	51	42	36	50	42	36	40	35	31	30
8	47	38	32	46	37	31	36	31	27	26
9	43	34	28	42	33	27	32	27	23	22
10	40	30	25	39	30	24	29	24	21	19

Zonal Lumens Summary

Zone	Lumens	%Lamp	%Fixture
0-30	2007	23.1	31.0
0-40	3456	39.7	53.4
0-60	5963	68.5	92.1
0-90	6474	74.4	100.0
90-180	0	0	0
0-180	6474	74.4	100.0

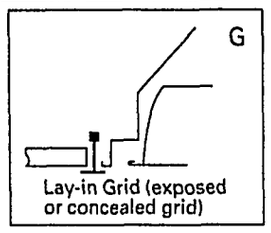
EXAMPLE

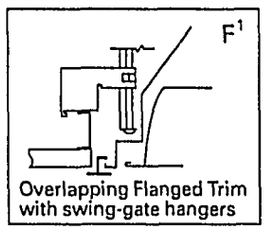
PM2 2'x4' 2" Louver Family, Paramax, 3 Lamps

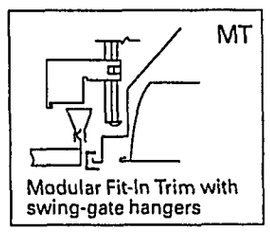
MOUNTING DATA

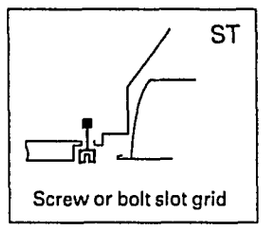
Continuous row mounting of flanged units requires CRE and CRM trim options (see Options).

Ceiling Type	Appropriate Trim Type
Exposed grid tee	G
Concealed grid tee	G, ST
Concealed Z-spline	F, MT
Metal pan (consult factory)	MT
Screw slot (consult factory)	ST
Acoustical tile, plaster, or plasterboard on rigid support parallel to lamps	F





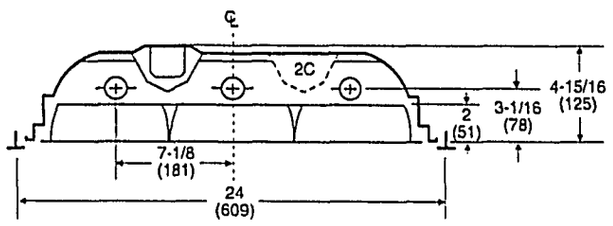




NOTE:
1 Recommended rough-in dimensions for F trim fixtures 24" x 48" (Tolerance is +1/4", -0"). Swing-gate range 1" to 4-3/16", span 23-1/2" to 26-5/16".

DIMENSIONS

Inches (millimeters). Subject to change without notice.



ORDERING INFORMATION

Example: **2PM2 G B 3 32 18LD 120 GEB**

2PM2 | G | B | 3 | 32 | 18 | LD | 277 | GEB

Series
- **2PM2** Paramax 2" deep cell parabolic, 2' wide

Trim type
- **G** Grid
- **F** Overlapping flanged
- **MT** Modular fit-in
- **ST** Screw slot

Air function
- **A** Air supply/return (slots in side trim)
- **H** Heat removal (through lamp cavity, dampers available)
- **D** Combination A & H
- **B** Static (no air function, matching appearance)

Number of lamps
- **3** Not included.

Lamp type
- **32** 32W T8 (48")
- **40** 40W T12 (48")

Number of cells[1]
- **18, 24, 32, 55**

Louver finish
- **LD** Low iridescent anodized diffuse silver
- **LS** Low iridescent anodized specular silver
- **C** Diffuse gold anodized (champagne)
- **G** Specular gold anodized
- **ND** Achroma™ non-iridescent diffuse silver

Voltage
- **120, 277, 347, MVOLT[2]**
- Others available.

Options
- **1/3** One 3-lamp ballast
- **GEB** Electronic ballast, ≤20% THD
- **GEB10IS** Electronic ballast, ≤10% THD, Instant Start
- **GEB10RS** Electronic ballast, ≤10% THD, Rapid Start
- **EL** Emergency battery pack (nominal 300 lumens; see Life Safety Section)
- **GLR** Internal fast-blow fuse
- **GMF** Internal slow-blow fuse
- **LST** Tandem fixture pairs (shared ballasts)
- **PWS1836** 6' prewire, 3/8" dia., 18-gauge, 3 wires
- **LP__** Lamped, specify lamp type and color
- **HRD** Heat-removal dampers
- **APB** Air-pattern control blades (A & D models only)
- **ACS** Air closure strips (A & D models only)
- **CRE** Flanged trim for continuous row mounting (end)
- **CRM** Flanged trim for continuous row mounting (middle)
- **PAF** Painted after fabrication (white enamel)
- **2R** Two full-depth channel cover reflectors[3]
- **2C** Two "V" shaped channel covers[3]
- **CSA** Listed and labeled to comply with Canadian Standards
- **NOM** Listed and labeled to comply with Mexican Standards
- **JP12** Palletized and stretch-wrapped (12 per); G and MT trim only

NOTES:
1 Where applicable, the number of rows is divisible by number of lamps unless specified otherwise.
2 MVOLT available with GEB10IS only.
3 Three-light models only.

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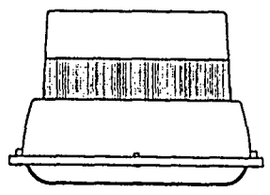
www.lithonia.com • IN CANADA: 1100 50TH AVE., LACHINE, QUEBEC H8T 2V3

G, GN



GARAGE LIGHTING

GP1 LUMINAIRE - TYPE 1R

GENERAL DESCRIPTION: The Gardco GP1 is a cutoff luminaire designed specifically for parking garage lighting. The Type 1R rectangular lighting distribution was developed to precisely conform to the geometry of parking structures. In addition, the precision diecast aluminum canopy, the corrosion resistant acrylic housing, and the moisture, insect, and pollutant excluding silicone gasketing all assure long fixture life.

ORDERING

PREFIX	WATTAGE	VOLTAGE	OPTIONS
GP1	175MH	120	POLY

PREFIX	WATTAGE	VOLTAGE
GP1	70HPS	120
	100HPS	208
	150HPS	240
		277
	70MH	347
	100MH	
	150MH	
	175MH	
	175PSMH[3]	
	200MH[1]	

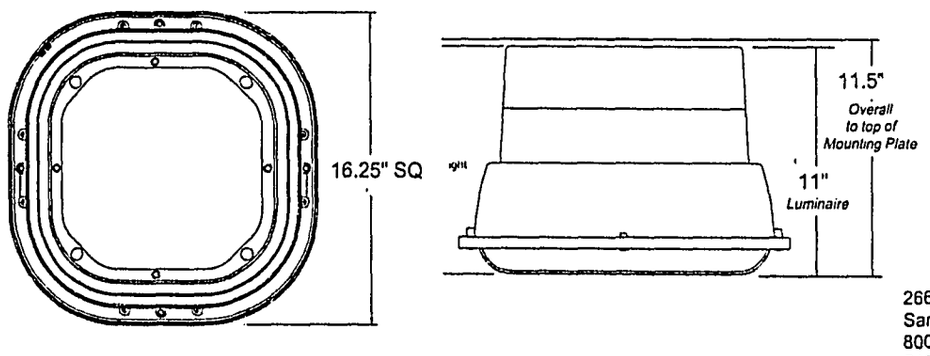
MH Metal Halide
PSMH Pulse Start Metal Halide
HPS High Pressure Sodium

1. *ANSI #M136*
2. *The GP1 is available in Industrial Grey only.*
3. *M137 or M152*

OPTIONS	
QS	Quartz Standby, DC Bayonet Socket. *Automatically activates an internal quartz lamp (100w.maximum) following a momentary power interruption. The quartz lamp remains on until the HID lamp restrikes.*
QST	Quartz Standby, Timed Bayonet Socket. *Automatically activates an internal quartz lamp (100w maximum) following a cold start or a momentary power interruption. The quartz lamp remains on until after the main HID lamp reaches an acceptable intensity level.*
Q924	Quartz Emergency Socket only *(100w maximum)*
POLY	Polycarbonate Downlight Lens
TP	Spanner Head Tamper Resistant Screws
F	Fusing
DR	Supplementary Downlight Reflector *(Provides additional area illumination and masks uplight)*
BX	Bird Excluding Shroud *(for pendant mounted units)*
JB	Balanced j-box with offset knock-out *(for non-rigid sway pendant mount)*
LFI	Lamp factory installed
IRS	Instant Restrike *(HPS only. Contact factory)*
TM	Trunnion Mount
KWR	Kilowatt reduction option *(Contact factory)*

TYPE	PREFIX	WATTAGE	VOLTAGE	OPTIONS
	GP1	175 MH	277	

DIMENSIONS



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Genlyte Thomas Group LLC

GARDCO LIGHTING

79115-72/1002

G, GN

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GARAGE LIGHTING

GP1 LUMINAIRE - TYPE 1R

SPECIFICATIONS

GENERAL: The Gardco GP1 is a cutoff garage luminaire utilizing medium base HID lamps to 200W. Each luminaire features a diecast electrical canopy, an acrylic housing with an uplight window, a metalized faceted downlight reflector system, a hydroformed uplight reflector, and an acrylic lens. Units are totally sealed and suitable for damp and wet locations.

QUICK MOUNT PLATE: A dieformed 14 ga. galvanized steel plate is supplied for mounting to a recessed, surface, or rigid pendant hung 4" j-box (standard j-box and rigid pendant by others). An integral hanger tab on the plate supports the luminaire during wiring.

UPPER ELECTRICAL CANOPY: The diecast aluminum canopy houses the ballast and wiring splices. After wiring, the canopy swings up and snaps securely to the Quick Mount Plate without tools.

HOUSING: The housing consists of a one piece acrylic housing with prismatic uplight window and opaque lower side section. The housing is fully gasketed to the upper canopy.

DOWNLIGHT REFLECTOR: Semi-specular metalized aluminum facets are precisely positioned to provide highly efficient Type 1R (rectangular) lighting distributions and sharp cut-off of source brightness at normal viewing angles.

UPLIGHT REFLECTOR: The hydroformed and anodized aluminum reflector is designed to generate illumination on the ceiling and vertical surfaces.

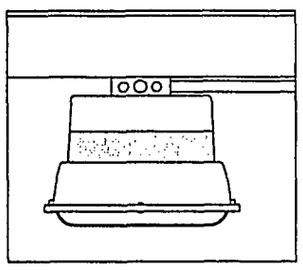
DOWNLIGHT LENS: An injection molded UV resistant acrylic lens is retained with captive fasteners. The lens hinges down for relamping. Memory retentive silicone gasketing seals the lens to the housing.

ELECTRICAL: Each high power factor ballast is the separate component type, capable of providing reliable lamp starting down to -20° F. Component-to-component wiring within the luminaire will carry no more than 80% of rated current and is listed by UL for use at 600 VAC at 150°C or higher. Plug disconnects are listed by UL for use at 600 VAC, 15A or higher.

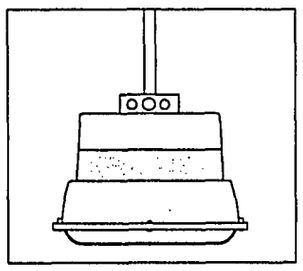
FINISH: The upper canopy is finished with polyester powdercoat. The opaque housing section is finished with acrylic lacquer. Architectural grey finish is standard.

LABELS: All fixtures bear UL or CUL (where applicable) Wet Location labels.

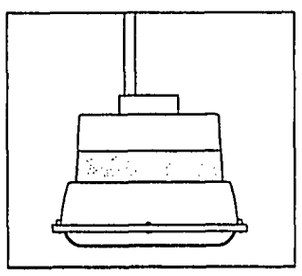
MOUNTING



Flush or surface mounting is easily accomplished with a galvanized steel quick mount plate (standard j-box by others).

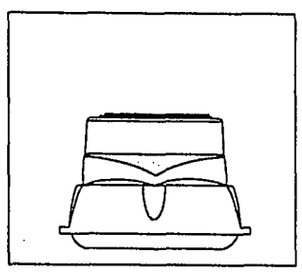


For rigid pendant mounting to conduit (by others), the Gardco Quick Mount plate is directly attached to a standard 4" j-box, as in surface ceiling mounted applications.

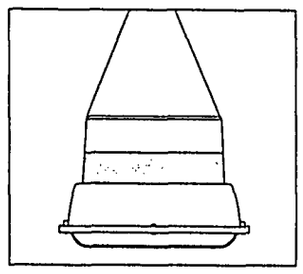


An off-set, self-leveling j-box balances the luminaire in those cases where the pendant mount is free swinging. (Swivel ceiling canopy and pendant by others.) For this option specify JB when ordering.

OPTIONS



The DR (Downlight Only Reflector) option provides an additional spun aluminum lower reflector which will significantly increase pavement illumination and mask any undesired uplight.



Practical options include a bird excluding shroud which prevents nesting and perching, reducing dirt and maintenance. A 12" minimum pendant length required.

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GARDCO LIGHTING

79115-72/1002

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H4, H8

Catalog Number	Type

FEATURES

- Premium gauge channel features gripper-back design for strength and rigidity.
- Available in tandem-wired lengths.
- Choice of width — 1-lamp and 2-lamp fixtures are 5" wide standard, 3-lamp and 4-lamp fixtures are 9" wide standard.
- Sturdy channel cover secured by quarter-turn latch for easy access to wireway.
- High-gloss, baked white enamel finish.
- Screw-on endplates.
- Accepts plug-in options for 1, 2 or 3 primary circuits.
- For unit or row installations, surface or suspended mounting. Channel connectors furnished standard.
- Guaranteed for one year against mechanical defects in manufacture.

SPECIFICATIONS

BALLAST — Thermally protected, resetting, Class P, HPF, non-PCB, UL listed, CSA-certified ballast is standard. Rapid start ballasts are sound rated A. Standard combinations are CBM approved and conform to UL 935.

WIRING & ELECTRICAL — Fixture conforms to UL 1570 and is suitable for damp locations. AWM, TFN or THHN wire used throughout, rated for required temperatures.

MATERIALS — Housing formed from cold-rolled steel. No asbestos is used in this product.

FINISH — Five-stage iron-phosphate pretreatment ensures superior paint adhesion and rust resistance. Painted parts finished with high-gloss, baked white enamel.

LISTING — UL listed and labeled. CSA certified (see options). NOM labeled (see options).

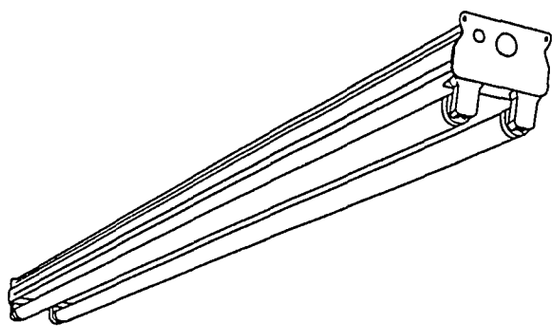
Specifications subject to change without notice.

Heavy-Duty Strip

UN

Rapid Start

2', 3' or 4' length
1, 2, 3 or 4 lamps



ENERGY

- Luminaire Efficiency Rating (LER)
  Two Lamp minimum LER.FS = 57.
  Based on 34W T12, 2650 lumen lamp and energy-saving magnetic ballast with ballast factor = .87 and input watts = 71.

Calculated in accordance with NEMA standard LE-5. See LER sheet for details.

PHOTOMETRICS

Calculated using the zonal cavity method in accordance with IESNA LM41 procedure. Floor reflectances are 20%. Lamp configurations shown are typical. Full photometric data on these and other configurations available upon request.

UN 2 40
Report ITL 21460
S/MH 1.6

Coefficient of Utilization

Ceiling	80%			70%			50%		
Wall	70%	50%	30%	70%	50%	30%	50%	30%	10%
1	91	86	82	87	82	79	76	73	70
2	82	74	67	78	71	65	65	60	56
3	74	64	57	71	62	55	57	51	46
4	68	56	48	64	54	47	50	44	39
5	61	49	41	58	47	40	44	37	32
10	41	28	21	39	27	21	25	19	15

Zonal Lumens Summary

Zone	Lumens	%Lamp	%Fixture
0-30	919	14.4	16.2
0-40	1568	24.5	27.7
0-60	3068	47.9	54.2
0-90	4661	72.8	82.4
90-180	999	15.6	17.6
0-180	5659	88.4	100.00

UN 2 32
Report L 5739
S/MH 1.6

Coefficient of Utilization

Ceiling	80%			70%			50%		
Wall	70%	50%	30%	70%	50%	30%	50%	30%	10%
1	98	92	87	93	88	84	81	77	74
2	88	79	71	83	75	69	69	64	59
3	79	68	60	75	66	58	60	54	48
4	72	60	51	68	57	49	53	46	40
5	65	51	43	62	50	42	46	39	33
10	43	30	22	41	29	22	27	20	16

Zonal Lumens Summary

Zone	Lumens	%Lamp	%Fixture
0-30	848	14.6	15.3
0-40	1444	24.9	26.1
0-60	2855	49.2	51.5
0-90	4505	77.7	81.3
90-180	1034	17.8	18.7
0-180	5540	95.5	100.00

UN 3 32
Report L 5617
S/MH 1.5

Coefficient of Utilization

Ceiling	80%			70%			50%		
Wall	70%	50%	30%	70%	50%	30%	50%	30%	10%
1	97	92	87	93	89	84	82	79	76
2	87	78	71	83	76	69	70	65	60
3	79	68	60	76	66	58	61	55	50
4	72	60	51	69	58	50	54	47	42
5	65	52	43	62	50	42	47	40	34
10	43	30	22	41	29	22	27	21	16

Zonal Lumens Summary

Zone	Lumens	%Lamp	%Fixture
0-30	1381	15.9	17.0
0-40	2347	27.0	28.9
0-60	4614	53.0	56.7
0-90	7104	81.7	87.3
90-180	1032	11.9	12.7
0-180	8136	93.5	100.0

H4, H8

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UN Rapid Start

MOUNTING DATA

For unit or row installation, surface or suspended mounting. Use hanger appropriate for fixture width.

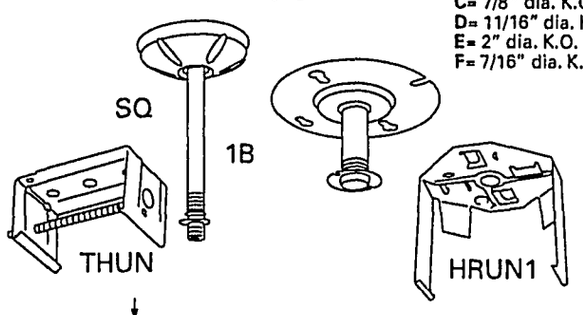
Unit installation — Minimum of two hangers required.

Row installation — One hanger per channel plus one per row required.

Hooker® **(HRUN)** and HC Hangers — Minimum two per channel (unit and row), for narrow body only.

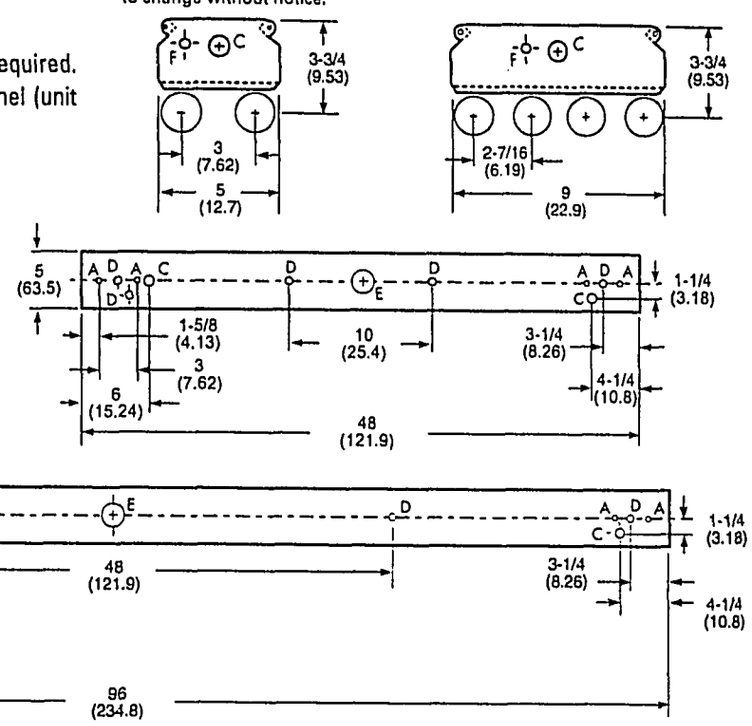
See ACCESSORIES below for hanging devices.

A= 1/4" x 1/2" hole
C= 7/8" dia. K.O.
D= 11/16" dia. K.O.
E= 2" dia. K.O.
F= 7/16" dia. K.O.



DIMENSIONS

Inches (centimeters). Subject to change without notice.



2UN 4 32 277 GEB WGCUN

ORDERING INFORMATION

Example: **UN 4 40 120 ES GLR**

UN 2 32 277 GEB WGCUN

Series

- **UN** Standard width
- **2UN** 1 or 2 lamps in 9"-wide body

For tandem double-length unit, add prefix **T**. Example: **TUN**

Lamp type

- **17** 17W T8 (24")
- **20PH** 20W PH T12 (24")*
- **20** 20W TS T12 HPF (24")
- **25** 25W T8 (36")
- **30PH** 30W PH T12 (36")*
- **30** 30W RS HPF T12 (36")
- **32** 32W T8 (48")
- **40** 40W T12 (48")

* PH ballasts available in 120V only.

Number of lamps

1, 2, 3, 4

Not included

Voltage

120, 277, 347

Others available

Options

- **ES** Energy-saving ballasts (30W or 40W only).
- **CW** Cold-weather ballasts, 0°F starting.
- **GEB** Electronic ballasts, ≤20% THD.
- **GEB10** Electronic ballasts, ≤10% THD.
- **EL** Emergency battery pack (nominal 300 lumens). See Life Safety Section.
- **LPF** Low-power factor ballasts (20W & 30W only).
- **GLR** Internal fast-blow fuse (add **X** for external).
- **GMF** Internal slow-blow fuse (add **X** for external).
- **CS1** 6' cordset, NEMA 5-15P SJT, U-ground plug, 120V.
- **CS7** 6' cordset, NEMA 5-15P SJT, U-ground plug, 277V.
- **CS3** 6' cordset, NEMA L5-15P SJT, twist-lock plug, 120V.
- **PLF_** Plug-in wiring. Specify 1, 2 or 3 branch circuits and hot wires (**A**=Black, **B**=Red, **C**=Blue, **AB** or **AC**).
- **TILW** Tandem in-line wiring.
- **CSA** CSA-labeled for US shipment to Canada.
- **NOM** NOM-labeled for shipment to Mexico.
- **SW** Palletized and stretch-wrapped.
- **HC36** Chain-hanger set packed in channel (36" length for 5" bodies only).

Accessories

Order as separate catalog numbers.

- **SQ_** Swivel-stem hanger (specify length in 2" increments).
- **1B** Ceiling spacer (adjusts from 1-1/2" to 2-1/2" from ceiling).
- **DSH24** Double-stem hanger for 4' fixtures, 24" stems.

5" HOUSINGS ONLY

- **UNCEP** Optional deep endplates.
- **HC36** Chain hangers (1 pair, 36" long).
- **THUN** Tong hanger for 5" UN channel.
- **HRUN** Hooker® T-bar hanger for 5" channel (flush to ceiling).
- **HRUN1** Hooker® T-bar hanger for 5" channel (1-1/2" from ceiling).
- **EJR 48WH** Symmetric reflector, 4' white (12" aperture).
- **UNASR 48WH** Asymmetric reflector, 4' white (8-1/2" aperture).
- **WGCUN** Wireguard, 4' white.[1]
- **WGEJ** Wireguard for EJ reflector, 4' white.[1]
- **WGUNASR** Wireguard for UNASR reflector, 4' white.[1]

9" HOUSINGS ONLY

- **TH2UN** Tong hanger for 9" channel.
- **2UNASR 48WH** Asymmetric reflector, 4' white.[1]
- **WG2UN** Wireguard, 4' white.[1]

Note:
1 Order two for 8' fixture.

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IN CANADA: 1100 50TH AVE., LACHINE, QUEBEC H8T 2V3, A UNIT OF N.S.I. HOLDINGS, INC.

K4

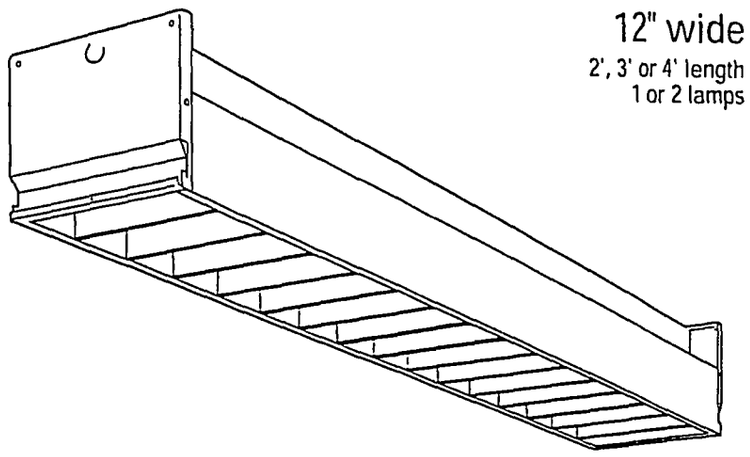
Catalog Number	Type

Narrow Aperture Troffer

NAT

12" wide

2', 3' or 4' length
1 or 2 lamps



FEATURES

- Narrow 12" wide housing adds architectural detailing to ceiling plane.
- NAT models available as complete units in 2', 3' and 4' lengths. Companion CNAT and TCNAT models feature continuous shielding in rows.
- Wide selection of lay-in, lift-and-shift shielding, including anodized aluminum parabolic louvers in 2" or 1½" depth.
- Flat shielding may be lay-in without door frame or lay-in with aluminum door frame. Regressed or flush appearance available.
- Static, no reveal.
- Compatible with most ceiling types.
- Guaranteed for one year against mechanical defects in manufacture.

SPECIFICATIONS

BALLAST — Thermally protected, resetting, Class P, HPF, non-PCB, UL listed, CSA certified, standard. Energy-saving and electronic ballasts are sound-rated A. Standard combinations are CBM approved and conform to UL 935.

WIRING & ELECTRICAL — Fixture conforms to UL 1570 and is suitable for damp locations. AWM, TFN or THHN wire used throughout, rated for required temperatures.

MATERIALS — Housing formed from cold-rolled steel. Louvers formed from anodized aluminum. No asbestos is used in this product.

FINISH — Five-stage iron-phosphate pretreatment ensures superior paint adhesion and rust resistance. Painted parts finished with high-gloss, baked white enamel.

LISTING — UL listed and labeled. Listed and labeled to comply with Canadian and Mexican standards (see options).

Specifications subject to change without notice.

PHOTOMETRICS

Calculated using the zonal cavity method in accordance with IESNA LM41 procedure. Floor reflectances are 20%. Lamp configurations shown are typical. Full photometric data on these and other configurations available upon request.

NAT/CNAT 2 40 203LD

Report LTL 5209

S/MH (along) 1.2 (across) 1.5

Coefficient of Utilization

Ceiling	80%			70%			50%		
Wall	70%	50%	30%	70%	50%	30%	50%	30%	10%
1	66	64	62	65	63	61	60	59	58
2	62	58	55	60	57	54	55	52	50
3	57	52	48	56	51	47	49	46	44
4	53	47	42	51	46	42	44	41	38
5	48	42	37	47	41	36	40	36	33
10	32	24	19	31	24	19	23	19	16

Zonal Lumens Summary

Zone	Lumens	%Lamp	%Fixture
0-30	1154	18.3	30.8
0-40	1933	30.7	51.6
0-60	3462	55.0	92.4
0-90	3747	59.5	100.0
90-180	0	0.0	0.0
0-180	3747	59.5	100.0

NAT/CNAT 2 32 203LD

Report LTL 5203

S/MH (along) 1.2 (across) 1.5

Coefficient of Utilization

Ceiling	80%			70%			50%		
Wall	70%	50%	30%	70%	50%	30%	50%	30%	10%
1	71	69	66	69	67	65	64	63	62
2	66	62	58	64	61	57	58	56	53
3	61	55	51	60	54	51	53	49	47
4	56	50	45	55	49	44	47	43	40
5	52	44	39	50	44	39	42	38	35
10	34	26	21	33	25	20	25	20	17

Zonal Lumens Summary

Zone	Lumens	%Lamp	%Fixture
0-30	1125	19.4	30.5
0-40	1885	32.5	51.1
0-60	3405	58.7	92.2
0-90	3692	63.7	100.0
90-180	0	0.0	0.0
0-180	3692	63.7	100.0

LITHONIA LIGHTING
COMMERCIAL & INDUSTRIAL FLUORESCENT LIGHTING

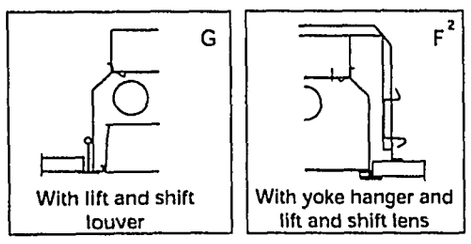
K4

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

NAT 12" wide

MOUNTING DATA

Ceiling Type	Appropriate Trim Type
Exposed grid tee, concealed grid tee or screw slot	G, GF[1], GF1
Concealed Z-spline	F
Acoustical tile, plaster or plasterboard on rigid support parallel to lamps	F[2]

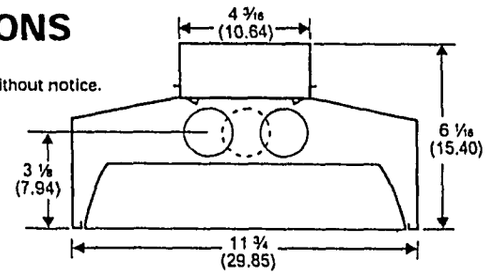


[1] GF trim requires LATC clips (provided standard). Ceiling grid supports fixture end. Flange trim supports ceiling tile along length of fixture.

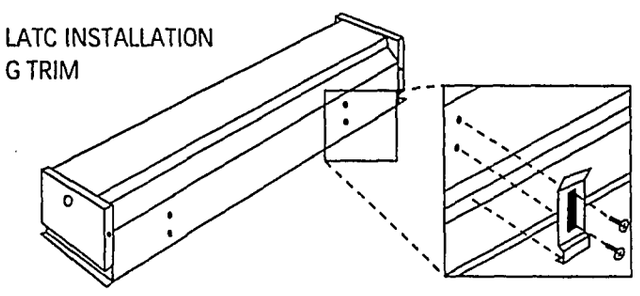
[2] Recommended rough-in dimension for F trim fixtures: Nominal fixture length by 12-1/8" (Tolerance is +1/4", -0").

DIMENSIONS

Inches (centimeters)
Subject to change without notice.



LATC INSTALLATION
G TRIM



ORDERING INFORMATION

Example: **NAT F 1 32 203LD 120 GEB**

NAT F 2 32 203LD 277 GEB

Series
NAT 12" wide, unit shielding.

Mounting
- **G** Lay-in grid
- **F** Flanged
- **GF** Grid ends, flanged sides support ceiling tile.
- **GF1** Grid trim ends and one grid side, one flange side to support ceiling tile.

Number of Lamps
1, 2
Not included.

Lamp Type
- **17** 17W T8 (24")
- **20** 20W T12 TS (24")
- **25** 25W T8 (36")
- **30** 30W T12 (36")
- **32** 32W T8 (48")
- **40** 40W T12 (48")

Row Information for Flanged Mounting Only
(Add suffix to catalog number)

- **CRE** Trim for continuous row end. Used when continuous appearance of shielding is desired. Two required per row.
- **CRM** Trim for continuous row middle. Used when continuous appearance of shielding is desired. Quantity per row is number of fixtures in row less two CRE.

Voltage
120, 277, 347
Others available.

Options
- **ES** Energy-saving ballasts (2-30W, 1-40W and 2-40W only)
- **GEB** Electronic ballasts, ≤20% THD
- **GEB10** Electronic ballasts, ≤10% THD
- **EL** Emergency battery pack (nominal 500 lumens)
- **EL11** Emergency battery pack (nominal 1100 lumens)
- **GLR** Internal fast-blow fuse (add **X** for external)
- **GMF** Internal slow-blow fuse (add **X** for external)
- **RIF1** Radio interference filter, 1 per fixture
- **RIF2** Radio interference filter, 1 per ballast
- **CSA** Listed and labeled to comply with Canadian standards.
- **NOM** Listed and labeled to comply with Mexican standards.

Number of Louver Cells

Lamp Length	2" Spacing	3" Spacing
24"	12	8
36"	18	12
48"	24	16

Louver Depth
- **15** 1.5" louver
- **20** 2" louver

Louver Blade Spacing
- **2** 2" center-to-center (1.5" louver depth only)
- **3** 3" center-to-center

Louver Finish
- **LD** Low iridescent semi-specular silver
- **LS** Low iridescent specular silver
- **G** Specular gold
- **C** Champagne gold
- **W** White enamel

or

Door Type
Door frame optional. Diffusers may be framed or unframed.
- **(Blank)** No frame, lay-in shielding
- **FW** Flush white aluminum
- **FN** Flush natural aluminum
- **FM** Flush black aluminum
- **RW** Regressed white aluminum
- **RN** Regressed natural aluminum
- **RM** Regressed black aluminum

Diffuser Type
- **A12** #12 pattern acrylic
- **A19** #19 pattern acrylic, .156" thick
- **PC1S** Plastic cube louver, ½" x ½" x ½", silver

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NAT.PM6

LITHONIA LIGHTING
COMMERCIAL & INDUSTRIAL FLUORESCENT LIGHTING
P.O. BOX A, CONYERS, GEORGIA 30207-0067. TELEPHONE 770 922-9000. FAX 770 860-3106
IN CANADA: 1100 50TH AVE., LACHINE, QUEBEC H8T 2V3, A UNIT OF N.S.I. HOLDINGS, INC.

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K8

Catalog Number	Type

FEATURES

- Narrow 12" wide housing adds architectural detailing to ceiling plane.
- CNAT and TCNAT models feature continuous shielding in rows. Order accessory endplates, one pair per row.
- Innovative universal housing louver design simplifies fixture layout and installation.
- Companion NAT models available as complete units in 2', 3' and 4' lengths.
- Choice of lay-in, lift-and-shift shielding, either acrylic prismatic lenses or anodized aluminum parabolic shielding in 2" or 1 1/2" depth.
- Static, no reveal.
- Compatible with most ceiling types.
- Guaranteed for one year against mechanical defects in manufacture.

SPECIFICATIONS

BALLAST — Thermally protected, resetting, Class P, HPF, non-PCB, UL listed, CSA certified, standard. Energy-saving and electronic ballasts are sound-rated A. Standard combinations are CBM approved and conform to UL 935.

WIRING & ELECTRICAL — Fixture conforms to UL 1570 and is suitable for damp locations. AWM, TFN or THHN wire used throughout, rated for required temperatures.

MATERIALS — Housing formed from cold-rolled steel. Louvers formed from anodized aluminum. No asbestos is used in this product.

FINISH — Five-stage iron-phosphate pretreatment ensures superior paint adhesion and rust resistance. Painted parts finished with high-gloss, baked white enamel.

LISTING — UL listed. CSA certified (see options). NOM labeled (see options).

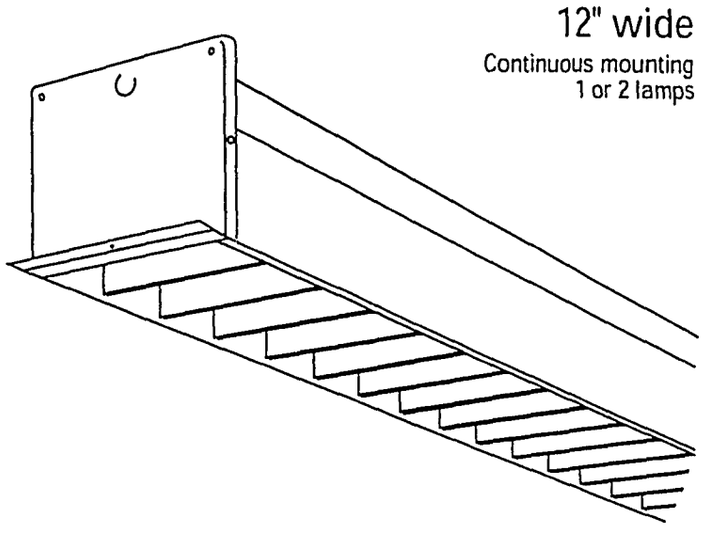
Specifications subject to change without notice.

Continuous Narrow Aperture Troffer

CNAT

12" wide

Continuous mounting
1 or 2 lamps



NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

PHOTOMETRICS

Calculated using the zonal cavity method in accordance with IESNA LM41 procedure. Floor reflectances are 20%. Lamp configurations shown are typical. Full photometric data on these and other configurations available upon request.

NAT/CNAT 2 40 203LD

Report LTL 5209

S/MH (along) 1.2 (across) 1.5

Coefficient of Utilization

Ceiling	80%			70%			50%		
Wall	70%	50%	30%	70%	50%	30%	50%	30%	10%
1	66	64	62	65	63	61	60	59	58
2	62	58	55	60	57	54	55	52	50
3	57	52	48	56	51	47	49	46	44
4	53	47	42	51	46	42	44	41	38
5	48	42	37	47	41	36	40	36	33
10	32	24	19	31	24	19	23	19	16

Zonal Lumens Summary

Zone	Lumens	%Lamp	%Fixture
0-30	1154	18.3	30.8
0-40	1933	30.7	51.6
0-60	3462	55.0	92.4
0-90	3747	59.5	100.0
90-180	0	0.0	0.0
0-180	3747	59.5	100.0

NAT/CNAT 2 32 203LD

Report LTL 5203

S/MH (along) 1.2 (across) 1.5

Coefficient of Utilization

Ceiling	80%			70%			50%		
Wall	70%	50%	30%	70%	50%	30%	50%	30%	10%
1	71	69	66	69	67	65	64	63	62
2	66	62	58	64	61	57	58	56	53
3	61	55	51	60	54	51	53	49	47
4	56	50	45	55	49	44	47	43	40
5	52	44	39	50	44	39	42	38	35
10	34	26	21	33	25	20	25	20	17

Zonal Lumens Summary

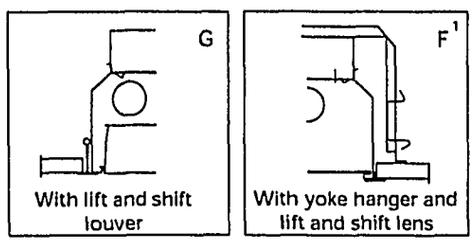
Zone	Lumens	%Lamp	%Fixture
0-30	1125	19.4	30.5
0-40	1885	32.5	51.1
0-60	3405	58.7	92.2
0-90	3692	63.7	100.0
90-180	0	0.0	0.0
0-180	3692	63.7	100.0

DEFECTIVE

CNAT 12" wide

MOUNTING DATA

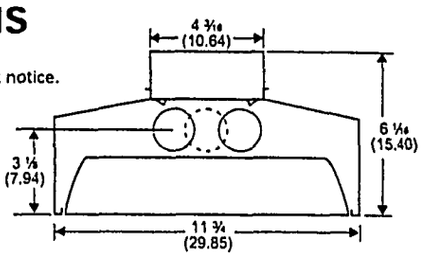
Ceiling Type	Appropriate Trim Type
Exposed grid tee, concealed grid tee or screw slot	G
Concealed Z-spline	F
Acoustical tile, plaster or plasterboard on rigid support parallel to lamps	F[2]



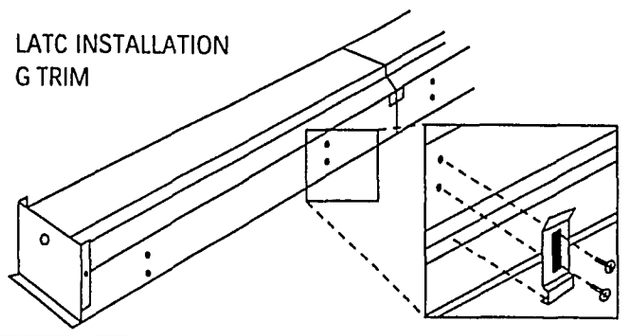
[1]Recommended rough-in dimension for F trim fixtures: Nominal fixture length by 12-1/8" (Tolerance is +1/4", -0").

DIMENSIONS

Inches (centimeters)
Subject to change without notice.



LATC INSTALLATION
G TRIM



ORDERING INFORMATION

Example: **CNAT F 1 32 203LD 120 GEB**

CNAT F 2 32 203LD 277 GEB

Series
- **NAT** 12" wide, unit shielding.
- **TCNAT** Tandem 12" wide, continuous shielding. 6' and 8' units: unitized housing. Tandem lamp configuration, continuous louver.

Mounting
- **G** Lay-in grid
- **F** Flanged

Number of Lamps
- **1, 2**
- Not included.

Lamp Type
- **17** 17W T8 (24")
- **20** 20W T12 TS (24")
- **25** 25W T8 (36")
- **30** 30W T12 (36")
- **32** 32W T8 (48")
- **40** 40W T12 (48")

Louver Depth
- **15** 1.5" louver
- **20** 2" louver

Louver Blade Spacing
- **2** 2" center-to-center (1.5" louver depth only)
- **3** 3" center-to-center

Louver Finish
- **LD** Low iridescent semi-specular silver
- **LS** Low iridescent specular silver
- **G** Specular gold
- **C** Champagne gold
- **W** White enamel

Number of Louver Cells

Lamp Length	2" Spacing	3" Spacing
24"	12	8
36"	18	12
48"	24	16
72"	18x2*	12x2*
96"	24x2*	16x2*

* Tandem units use two louvers.

or

Diffuser Type
- **A12** #12 pattern acrylic
- **A19** #19 pattern acrylic, .156" thick
- **PC1S** Plastic cube louver, ½" x ½" x ½", silver

Voltage
- **120, 277, 347**
- Others available.

Options
- **ES** Energy-saving ballasts (2-30W, 1-40W and 2-40W only)
- **GEB** Electronic ballasts, ≤20% THD
- **GEB10** Electronic ballasts, ≤10% THD
- **EL** Emergency battery pack (nominal 500 lumens)
- **EL11** Emergency battery pack (nominal 1100 lumens)
- **GLR** Internal fast-blow fuse (add **X** for external)
- **GMF** Internal slow-blow fuse (add **X** for external)
- **RIF1** Radio interference filter, 1 per fixture
- **RIF2** Radio interference filter, 1 per ballast
- **LATC** Screw-on grid troffer clips (4)
- **CSA** CSA labeled for US shipment to Canada

Accessories

Order as separate item.

- **CNATGEP** One pair endplates for 12" CNAT with G trim. Endplate trim supports ceiling tile. Order one pair per row.
- **CNATFEP** One pair endplates for 12" CNAT with F trim. Order one pair per row.

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LITHONIA LIGHTING
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IN CANADA: 1100 50TH AVE., LACHINE, QUEBEC H8T 2V3, A UNIT OF N.S.I. HOLDINGS, INC.

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M

LITHONIA LIGHTING

Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

INTENDED USE

For general downlight applications that demand superior brightness control in restricted plenum areas.

CONSTRUCTION

16-gauge galvanized steel mounting/plaster frame with integral yoke to retain optical system. Maximum 1.5-inch ceiling thickness.

Expandable, self-locking mounting bars provide horizontal and vertical adjustment.

Galvanized steel junction box with bottom-hinged access covers and spring latches. Two combination 1/2" - 3/4" and four 1/2" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out) No. 12 AWG conductors, rated for 90°C.

OPTICAL SYSTEM

Self-flanged, specular clear or semi-diffuse reflector.

Bounding Ray Optical Principle provides: lamp before lamp image, lamp image that reflects smoothly from the top of the reflector to the aperture and optimal fixture performance and efficiency.

Controlled anodized coating suppresses iridescence.

Hinged lampdoor allows relamping while sealing upper trim for optimal fixture efficiency and the reduction of stray light in the plenum.

ELECTRICAL SYSTEM

Horizontally-mounted, four pin, positive latch thermoplastic socket.

Class P, thermally-protected, high power factor electronic ballast mounted to the junction box (CP and EL ballast mounted on ballast tray).

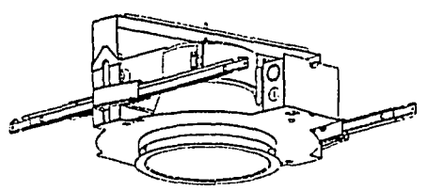
LISTING

UL Listed (standard). CSA Certified (see Options). Fixtures are UL listed for thru-branch wiring, recessed mounting and damp locations.

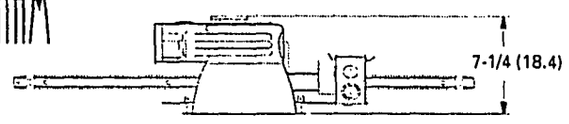
Compact Fluorescent Lighting

6" AF

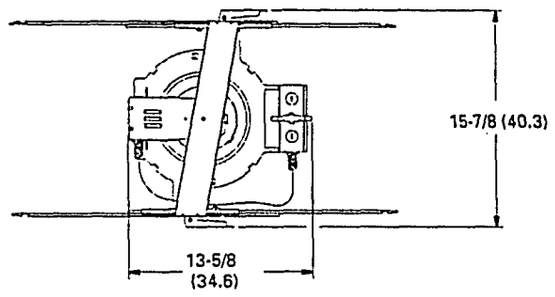
OPEN REFLECTOR
Horizontal Lamp
Triple-Tube



GOTHAM



Aperture: 6-1/4 (15.9)
Ceiling Opening: 7-1/8 (18.1)
Overlap Trim: 7-1/2 (19.1)



All dimensions are inches (centimeters).

ORDERING INFORMATION

Example: **AF 1/26TRT 6AR MVOLT**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog number (shipped separately).

AF	1/32TRT	6AR	—	277	—	BH24
Series	**Wattage/Lamp**	**Reflector/Color**	**Finish**	**Voltage**	**Ballast**	**Options**

Series	Wattage/Lamp	Reflector/Color	Finish	Voltage	Ballast	Options
AF	1/18TRT	6AR Clear	(blank) Specular low iridescent	MVOLT[4]	(blank) GEB10 standard. Electronic ballast. Requires four-pin lamp.	WLP With 35°K lamp (shipped separately).
	1/26TRT	6PR Pewter	LD Semi-diffuse low iridescent	120	DMHL[5] Lutron Hi-Lume electronic dimming ballast. Minimum dimming level 5%.	TRW White flange.
	1/32TRT	6UBR Umber		277	ADEZ[5] Advance Mark X electronic dimming ballast. Minimum dimming level 5%.	EL[6] Emergency battery pack. Integral test switch provided.
	1/42TRT	6WTR Wheat		347		ELR Emergency battery pack. Remote test switch provided.
		6CR Champagne Gold[1]				GMF Single, slow-blow fuse (not available with MVOLT).
		6GR Gold[1]				RIF Radio Interference Filter.
		6MB Black Baffle[2,3]				LRC Provides compatibility with Lithonia Reloc System. Reloc System can be installed less this option with connectors provided by others. Access above ceiling required. For compatible Reloc Systems, see options and accessories tab.
		6BC Black Cone[2]				QDS Quick Disconnect for easy ballast replacement. Not available with EL or ELR option.
						CP Chicago Plenum (consult factory).
						CSA CSA Certified.

Accessories

Order as separate catalog number.

SC6FL Sloped ceiling adaptor. Degree of slope must be specified (10D, 15D, 20D, 25D, 30D). Ex: SC6FL **10D**

NOTES:
1. Not recommended for use with compact fluorescent lamp. Consult factory.
2. Not available with finishes.
3. White flange standard.
4. Multi-volt electronic ballast capable of operating on any line voltage between 120-277 volt.
5. Consult factory for specific availability.
6. Not available with black cone.

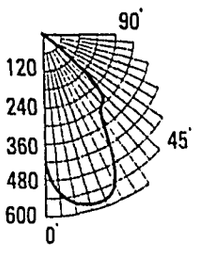
M

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

6" **AF** Open Reflector

Distribution curve	Distribution data	Output data	Coefficient of utilization	Illuminance Data at 30" Above Floor for a Single Luminaire

AF 1/18TRT 6AR, (1) CF18DT/E/IN/835, 1200 lumens per lamp, 1.3 s/mh, test no. LTL9404



From 0°	cp.	Lumens
0°	423	
5°	522	41
15°	579	123
25°	543	187
35°	328	175
45°	263	150
55°	12	17
65°	1	1
75°	1	1
85°	0	0
90°	0	

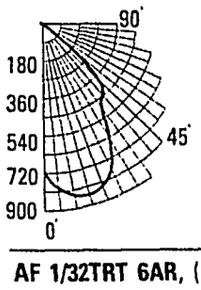
Zone	Lumens	%lamp
0°-30°	351.8	29.3
0°-40°	526.7	43.9
0°-60°	693.5	57.8
0°-90°	695.4	58.0
90°-180°	0.0	0.0
0°-180°	695.4	58.0*

*Efficiency

ρf	20%					
ρc	80%		70%		50%	
ρw	50%	30%	50%	30%	50%	30%
1	63	62	62	61	60	59
2	58	56	57	55	55	53
3	53	50	53	49	51	48
4	49	45	48	45	47	44
5	45	41	44	41	43	40
6	42	38	41	37	40	37
7	38	34	38	34	37	34
8	36	32	35	31	35	31
9	33	29	33	29	32	29
10	31	27	31	27	30	27

Mount height	Initial fc at beam center	50% beam angle 60.9° Beam diameter	50% beam angle 60.9° fc at beam edge	10% beam angle 94.1° Beam diameter	10% beam angle 94.1° fc at beam edge
8'	14.0	6.5	7.0	11.8	1.4
10'	7.5	8.8	3.8	16.1	0.8
12'	4.7	11.2	2.3	20.4	0.5
14'	3.2	13.5	1.6	24.7	0.3
16'	2.3	15.9	1.2	29.0	0.2

AF 1/26TRT 6AR, (1) CF26DT/E/IN/835, 1800 lumens per lamp, 1.2 s/mh, test no. LTL9391



From 0°	cp.	Lumens
0°	713	
5°	792	72
15°	850	206
25°	765	307
35°	493	282
45°	383	232
55°	15	27
65°	1	2
75°	0	1
85°	0	0
90°	0	

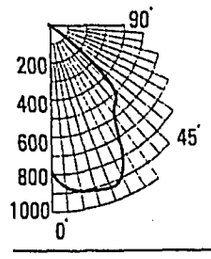
Zone	Lumens	%lamp
0°-30°	584.2	32.5
0°-40°	866.2	48.1
0°-60°	1125.1	62.5
0°-90°	1127.4	62.6
90°-180°	0.0	0.0
0°-180°	1127.4	62.6*

*Efficiency

ρf	20%					
ρc	80%		70%		50%	
ρw	50%	30%	50%	30%	50%	30%
1	69	67	67	66	65	64
2	63	60	62	59	60	58
3	58	54	57	54	55	52
4	53	49	52	49	51	48
5	49	45	48	44	47	44
6	45	41	45	41	44	40
7	42	37	41	37	40	37
8	39	34	38	34	38	34
9	36	32	36	32	35	31
10	34	30	33	29	33	29

Mount height	Initial fc at beam center	50% beam angle 59.9° Beam diameter	50% beam angle 59.9° fc at beam edge	10% beam angle 93.8° Beam diameter	10% beam angle 93.8° fc at beam edge
8'	23.6	6.3	11.8	11.8	2.4
10'	12.7	8.6	6.3	16.0	1.3
12'	7.9	11.0	4.0	20.3	0.8
14'	5.4	13.3	2.7	24.6	0.5
16'	3.9	15.6	2.0	28.8	0.4

AF 1/32TRT 6AR, (1) CF32DT/E/IN/835, 2400 lumens per lamp, 1.3 s/mh, test no. LTL9390



From 0°	cp.	Lumens
0°	784	
5°	868	79
15°	914	230
25°	890	354
35°	587	332
45°	473	273
55°	22	31
65°	2	3
75°	1	2
85°	1	1
90°	0	

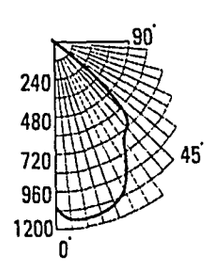
Zone	Lumens	%lamp
0°-30°	663.0	27.6
0°-40°	995.2	41.5
0°-60°	1299.6	54.2
0°-90°	1304.8	54.4
90°-180°	0.0	0.0
0°-180°	1304.8	54.4*

*Efficiency

ρf	20%					
ρc	80%		70%		50%	
ρw	50%	30%	50%	30%	50%	30%
1	60	58	58	57	56	55
2	55	52	54	51	52	50
3	50	47	49	46	48	45
4	46	43	45	42	44	41
5	42	39	42	38	41	38
6	39	35	39	35	38	35
7	36	32	36	32	35	32
8	33	30	33	29	32	29
9	31	27	31	27	30	27
10	29	25	29	25	28	25

Mount height	Initial fc at beam center	50% beam angle 62.0° Beam diameter	50% beam angle 62.0° fc at beam edge	10% beam angle 94.1° Beam diameter	10% beam angle 94.1° fc at beam edge
8'	25.9	6.6	13.0	11.8	2.6
10'	13.9	9.0	7.0	16.1	1.4
12'	8.7	11.4	4.3	20.4	0.9
14'	5.9	13.8	3.0	24.7	0.6
16'	4.3	16.2	2.2	29.0	0.4

AF 1/42TRT 6AR, (1) CF42DT/E/IN/835, 3200 lumens per lamp, 1.3 s/mh, test no. LTL9521



From 0°	cp.	Lumens
0°	1058	
5°	1135	107
15°	1136	323
25°	1043	487
35°	774	473
45°	622	374
55°	26	41
65°	2	2
75°	1	1
85°	0	0
90°	0	

Zone	Lumens	%lamp
0°-30°	916.8	28.6
0°-40°	1390.1	43.4
0°-60°	1805.1	56.4
0°-90°	1808.4	56.5
90°-180°	0.0	0.0
0°-180°	1808.4	56.5*

*Efficiency

ρf	20%					
ρc	80%		70%		50%	
ρw	50%	30%	50%	30%	50%	30%
1	62	60	61	59	58	57
2	57	54	56	53	54	52
3	52	49	51	48	50	47
4	48	44	47	44	46	43
5	44	40	43	40	42	39
6	41	37	40	36	39	36
7	38	34	37	33	36	33
8	35	31	34	31	34	30
9	32	28	32	28	31	28
10	30	26	30	26	29	26

Mount height	Initial fc at beam center	50% beam angle 62.5° Beam diameter	50% beam angle 62.5° fc at beam edge	10% beam angle 94.2° Beam diameter	10% beam angle 94.2° fc at beam edge
8'	35.0	6.7	17.5	11.8	3.5
10'	18.8	9.1	9.4	16.1	1.9
12'	11.7	11.5	5.9	20.4	1.2
14'	8.0	14.0	4.0	24.7	0.8
16'	5.8	16.4	2.9	29.0	0.6

NOTES:

1 For electrical characteristics, refer to electrical data tab.

2 Tested to current IES and NEMA standards under stabilized laboratory conditions. Various operating factors can cause differences between laboratory data and actual field measurements. Dimensions and specifications are based on the most current available data and are subject to change without notice.

3 Consult factory or IES file for microgroove baffle, black cone and other photometric reports.

Energy (Calculated in accordance with NEMA Standard LE-5)

LER.DOL	ANNUAL* ENERGY COST	LAMP DESCRIPTION	LAMP LUMENS	BALLAST FACTOR	INPUT WATTS
41	$5.83	1/26TRT	1800	0.98	27

* Comparative yearly lighting energy cost per 1,000 lumens

LITHONIA LIGHTING
An AcuityBrands Company

Sheet #: AF 6 TRT OPEN AF 6 TRT OPEN.p65 © 2002 Acuity Lighting Group, Inc. 02/02

Lithonia Lighting
Acuity Lighting Group, Inc.
Architectural Indoor Lighting
One Lithonia Way, Conyers, GA 30012-3957
Phone: 800-315-4982 Fax: 770-860-3129
In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

M8

LITHONIA LIGHTING

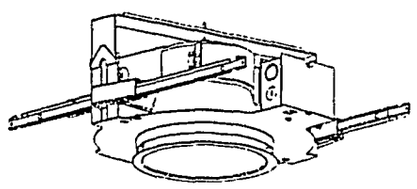
Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

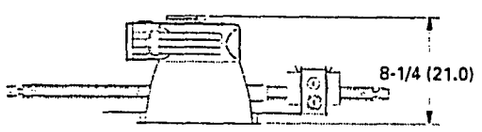
Compact Fluorescent Lighting

8" AF

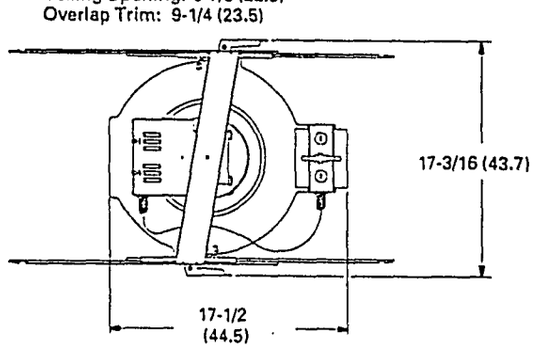
OPEN REFLECTOR
Horizontal Lamp
Triple-Tube



GOTHAM



Aperture: 8 (20.3)
Ceiling Opening: 8-7/8 (22.5)
Overlap Trim: 9-1/4 (23.5)



All dimensions are inches (centimeters).

INTENDED USE

For general downlight applications that demand superior brightness control in restricted plenum areas.

CONSTRUCTION

16-gauge galvanized steel mounting/plaster frame with integral yoke to retain optical system. Maximum 1.5-inch ceiling thickness.

Expandable, self-locking mounting bars provide horizontal and vertical adjustment.

Galvanized steel junction box with bottom-hinged access covers and spring latches. Two combination 1/2" - 3/4" and four 1/2" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out) No. 12 AWG conductors, rated for 90°C.

OPTICAL SYSTEM

Self-flanged, specular clear or semi-diffuse reflector.

Bounding Ray Optical Principle provides: lamp before lamp image, lamp image that reflects smoothly from the top of the reflector to the aperture and optimal fixture performance and efficiency.

Controlled anodized coating suppresses iridescence.

Hinged lampdoor allows relamping while sealing upper trim for optimal fixture efficiency and the reduction of stray light in the plenum.

ELECTRICAL SYSTEM

Horizontally-mounted, four pin, positive latch thermoplastic socket(s).

Class P, thermally-protected, high power factor electronic ballast(s) mounted to the junction box (CP and EL ballast mounted on ballast tray).

LISTING

UL Listed (standard). CSA Certified (see Options). Fixtures are UL listed for thru-branch wiring, recessed mounting and damp locations.

ORDERING INFORMATION

Example: **AF 2/32TRT 8AR MVOLT**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line.

AF	2/32TRT	8AR	–	277	–	BH24
Series	**Wattage/Lamp**	**Reflector/Color**	**Finish**	**Voltage**	**Ballast**	**Options**
AF	1/18TRT	8AR Clear	(blank) Specular low iridescent	MVOLT[5]	(blank) GEB10 standard. Electronic ballast. Requires four-pin lamp.	WLP With 35°K lamp (shipped separately).
	1/26TRT	8PR Pewter	LD Semi-diffuse low iridescent	120		TRW White flange.
	1/32TRT	8UBR Umber		277		EL[6,7] Emergency battery pack. Integral test switch provided.
	1/42TRT	8WTR Wheat		347	DMHL[6] Lutron Hi-Lume electronic dimming ballast. Minimum dimming level 5%.	ELR[6] Emergency battery pack. Remote test switch provided.
	1/57TRT[1]	8CR Champagne Gold[2]				GMF Single, slow-blow fuse (not available with MVOLT).
	2/18TRT					
	2/26TRT	8GR Gold[2]				RIF Radio Interference Filter.
	2/32TRT	8MB Black Baffle[3,4]			ADEZ[6] Advance Mark X electronic dimming ballast. Minimum dimming level 5%.	LRC Provides compatibility with Lithonia Reloc System. Lithonia Reloc System can be installed less this option with connectors provided by others. Access above ceiling required. For compatible Reloc Systems, refer to options and accessories tab.
	2/42TRT	8BC Black Cone[3]				QDS Quick Disconnect for easy ballast replacement. Not available with EL or ELR option.
						CP Chicago Plenum (consult factory).
						CSA CSA Certified.

Accessories

Order as separate catalog number.

SC8FL Sloped ceiling adaptor. Degree of slope must be specified (10D, 15D, 20D, 25D, 30D). Ex: SC8FL 10D

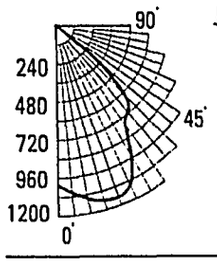
NOTES:
1. For use with Sylvania lamps only.
2. Not recommended for use with compact fluorescent lamp. Consult factory.
3. Not available with finishes.
4. White flange standard.
5. Multi-volt electronic ballast capable of operating on any line voltage between 120-277 volt.
6. Consult factory for specific availability.
7. Not available with black cone.

M8

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

8" AF Open Reflector

AF 1/32TRT 8AR, (1) CF32DT/E/IN/835, 2400 lumens per lamp, 1.3 s/mh, test no. LTL9452



From 0°	cp.	Lumens
0°	1005	
5°	1053	95
15°	1140	275
25°	1105	416
35°	768	405
45°	622	354
55°	42	46
65°	11	11
75°	9	10
85°	8	8
90°	0	

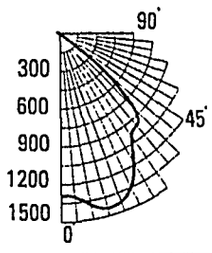
Zone	Lumens	%lamp
0°-30°	785.7	32.7
0°-40°	1190.3	49.6
0°-60°	1590.4	66.3
0°-90°	1619.7	67.5
90°-180°	0.0	0.0
0°-180°	1619.7	67.5*

*Efficiency

pf	80%		20% 70%		50%	
pc						
pw	50%	30%	50%	30%	50%	30%
1	74	72	72	70	69	68
2	67	64	66	63	64	61
3	62	57	61	57	59	56
4	56	52	56	51	54	50
5	52	47	51	47	50	46
6	48	43	47	43	46	42
7	44	39	43	39	43	38
8	41	36	40	36	39	35
9	38	33	37	33	37	33
10	35	31	35	30	34	30

Mount height	Initial fc at beam center	50% beam angle 61.0° Beam diameter	50% beam angle 61.0° fc at beam edge	10% beam angle 94.7° Beam diameter	10% beam angle 94.7° fc at beam edge
8'	33.2	6.5	16.6	11.9	3.3
10'	17.9	8.8	8.9	16.3	1.8
12'	11.1	11.2	5.6	20.6	1.1
14'	7.6	13.5	3.8	25.0	0.8
16'	5.5	15.9	2.8	29.3	0.6

AF 1/42TRT 8AR, (1) CF42DT/E/IN/835, 3200 lumens per lamp, 1.3 s/mh, test no. LTL9455



From 0°	cp.	Lumens
0°	1295	
5°	1303	122
15°	1437	373
25°	1347	588
35°	998	570
45°	848	464
55°	42	49
65°	4	4
75°	1	1
85°	0	0
90°	0	

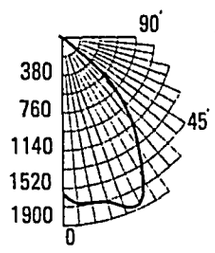
Zone	Lumens	%lamp
0°-30°	1083.2	33.8
0°-40°	1653.4	51.7
0°-60°	2166.3	67.7
0°-90°	2171.7	67.9
90°-180°	0.0	0.0
0°-180°	2171.7	67.9*

*Efficiency

pf	80%		20% 70%		50%	
pc						
pw	50%	30%	50%	30%	50%	30%
1	74	72	73	71	70	69
2	68	65	67	64	65	62
3	62	59	61	58	60	57
4	57	53	56	52	55	51
5	53	48	52	48	51	47
6	49	44	48	43	47	43
7	45	40	44	40	43	39
8	41	37	41	37	40	36
9	38	34	38	34	37	33
10	36	31	36	31	35	31

Mount height	Initial fc at beam center	50% beam angle 64.5° Beam diameter	50% beam angle 64.5° fc at beam edge	10% beam angle 94.8° Beam diameter	10% beam angle 94.8° fc at beam edge
8'	42.8	6.9	21.4	12.0	4.3
10'	23.0	9.5	11.5	16.3	2.3
12'	14.3	12.0	7.2	20.7	1.4
14'	9.8	14.5	4.9	25.0	1.0
16'	7.1	17.0	3.6	19.3	0.7

AF 2/32TRT 8AR, (2) CF32DT/E/IN/835, 2400 lumens per lamp, 1.4 s/mh, test no. LTL9407



From 0°	cp.	Lumens
0°	1584	
5°	1676	165
15°	1720	514
25°	1849	795
35°	1348	815
45°	830	549
55°	36	63
65°	5	6
75°	2	2
85°	0	0
90°	0	

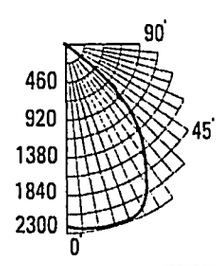
Zone	Lumens	%lamp
0°-30°	1473.7	30.7
0°-40°	2288.7	47.7
0°-60°	2901.1	60.4
0°-90°	2909.7	60.6
90°-180°	0.0	0.0
0°-180°	2909.7	60.6*

*Efficiency

pf	80%		20% 70%		50%	
pc						
pw	50%	30%	50%	30%	50%	30%
1	66	65	65	64	63	61
2	61	58	60	57	58	56
3	56	52	55	52	53	51
4	51	48	51	47	49	46
5	47	43	47	43	46	42
6	44	39	43	39	42	39
7	40	36	40	36	39	35
8	37	33	37	33	36	33
9	35	31	34	30	34	30
10	32	28	32	28	31	28

Mount height	Initial fc at beam center	50% beam angle 67.9° Beam diameter	50% beam angle 67.9° fc at beam edge	10% beam angle 94.3° Beam diameter	10% beam angle 94.3° fc at beam edge
8'	52.4	7.4	26.2	11.9	5.2
10'	28.2	10.1	14.1	16.2	2.8
12'	17.6	12.8	8.8	20.5	1.8
14'	12.0	15.5	6.0	24.8	1.2
16'	8.7	18.2	4.3	29.1	0.9

AF 2/42TRT 8AR, (2) CF42DT/E/IN/835, 3200 lumens per lamp, 1.4 s/mh, test no. LTL9406



From 0°	cp.	Lumens
0°	2211	
5°	2248	225
15°	2270	707
25°	2205	1097
35°	1699	1137
45°	1092	749
55°	47	84
65°	7	8
75°	3	3
85°	0	0
90°	0	

Zone	Lumens	%lamp
0°-30°	2029.5	31.7
0°-40°	3166.3	49.5
0°-60°	3999.6	62.5
0°-90°	4009.9	62.7
90°-180°	0.0	0.0
0°-180°	4009.9	62.7*

*Efficiency

pf	80%		20% 70%		50%	
pc						
pw	50%	30%	50%	30%	50%	30%
1	69	67	67	66	65	64
2	63	60	62	59	60	58
3	58	54	57	54	55	52
4	53	49	52	49	51	48
5	49	45	48	44	47	44
6	45	41	45	40	44	40
7	42	37	41	37	40	37
8	39	34	38	34	37	34
9	36	32	36	31	35	31
10	33	29	33	29	33	29

Mount height	Initial fc at beam center	50% beam angle 67.6° Beam diameter	50% beam angle 67.6° fc at beam edge	10% beam angle 94.1° Beam diameter	10% beam angle 94.1° fc at beam edge
8'	73.1	7.4	36.5	11.8	7.3
10'	39.3	10.0	19.7	16.1	3.9
12'	24.5	12.7	12.2	20.4	2.4
14'	16.7	15.4	8.4	24.7	1.7
16'	12.1	18.1	6.1	29.0	1.2

NOTES:

1 For electrical characteristics, refer to electrical data tab.
2 Tested to current IES and NEMA standards under stabilized laboratory conditions. Various operating factors can cause differences between laboratory data and actual field measurements. Dimensions and specifications are based on the most current available data and are subject to change without notice.
3 Consult factory or IES file for microgroove baffle, black cone and other photometric reports.

Energy (Calculated in accordance with NEMA Standard LE-5)

LER.DOL	ANNUAL* ENERGY COST	LAMP DESCRIPTION	LAMP LUMENS	BALLAST FACTOR	INPUT WATTS
47	$5.06	1/42TRT	3200	0.98	45

* Comparative yearly lighting energy cost per 1,000 lumens

LITHONIA LIGHTING
An AcuityBrands Company

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Lithonia Lighting
Acuity Lighting Group, Inc.
Architectural Indoor Lighting
One Lithonia Way, Conyers, GA 30012-3957
Phone: 800-315-4982 Fax: 770-860-3129
In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

MW

LITHONIA LIGHTING

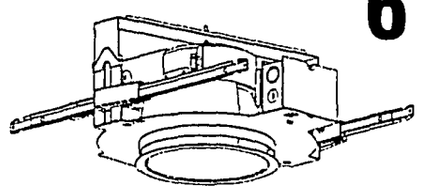
Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

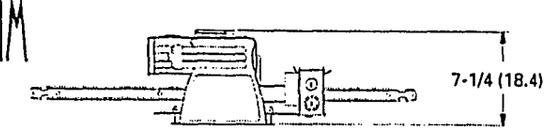
Compact Fluorescent Lighting

6" AFW

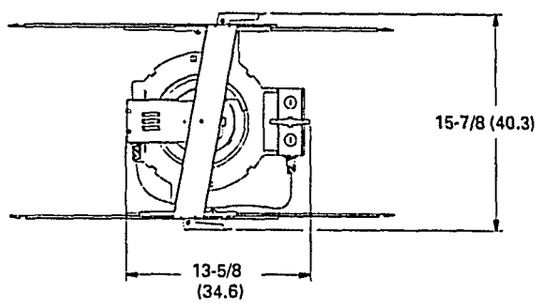
WALLWASH
Horizontal Lamp
Triple-Tube



GOTHAM



Aperture: 6-1/4 (15.9)
Ceiling Opening: 7-1/8 (18.1)
Overlap Trim: 7-1/2 (19.1)



All dimensions are inches (centimeters).

INTENDED USE

For general downlight wallwash applications that demand superior brightness control and uniform vertical illumination in restricted plenum areas.

CONSTRUCTION

16-gauge galvanized steel mounting/plaster frame with integral yoke to retain optical system. Maximum 1.5-inch ceiling thickness.

Expandable, self-locking mounting bars provide horizontal and vertical adjustment.

Galvanized steel junction box with bottom-hinged access covers and spring latches. Two combination 1/2" - 3/4" and four 1/2" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out) No. 12 AWG conductors, rated for 90°C.

OPTICAL SYSTEM

Self-flanged, specular clear or semi-diffuse reflector.

Bounding Ray Optical Principle provides: lamp before lamp image, lamp image that reflects smoothly from the top of the reflector to the aperture and optimal fixture performance and efficiency.

Controlled anodized coating suppresses iridescence.

Patented hybrid wallwash kicker provides uniform vertical illumination with light close to the ceiling with no roomside "back-flash."

Hinged lampdoor allows relamping while sealing upper trim for optimal fixture efficiency and the reduction of stray light in the plenum.

ELECTRICAL SYSTEM

Horizontally-mounted, four pin, positive latch thermoplastic socket.

Class P, thermally-protected, high power factor electronic ballast mounted to the junction box (CP and EL ballast mounted on ballast tray).

LISTING

UL Listed (standard). CSA Certified (see Options). Fixtures are UL listed for thru-branch wiring, recessed mounting and damp locations.

ORDERING INFORMATION

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line.

Example: **AFW 1/26TRT 6AR MVOLT**

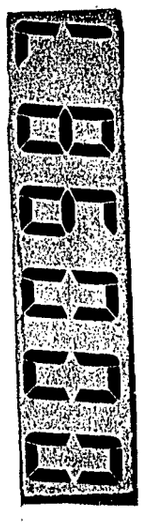
AFW 1/32TRT 6AR — — 277 — BHZ4

Series	Wattage/ Lamp	Reflector/Color	Finish	Lens Type	Voltage	Ballast	Options
AFW	1/18TRT	6AR Clear	(blank) Specular low iridescent	(blank) Open wallwash	MVOLT[2]	(blank) GEB10 standard. Electronic ballast. Requires four-pin lamp.	WLP With 35°K lamp (shipped separately).
	1/26TRT	6PR Pewter	LD Semi-diffuse low iridescent	CGL Clear glass lens	120	DMHL[3] Lutron Hi-Lume electronic dimming ballast. Minimum dimming level 5%.	TRW White flange.
	1/32TRT	6UBR Umber		CAL Clear acrylic lens	277	ADEZ[3] Advance Mark X electronic dimming ballast. Minimum dimming level 5%.	ELR Emergency battery pack. Remote test switch provided.
	1/42TRT	6WTR Wheat		PCL Clear polycarbonate lens	347		GMF Single, slow-blow fuse (not available with MVOLT).
		6CR Champagne Gold[1]					RIF Radio Interference Filter.
		6GR Gold[1]					LRC Provides compatibility with Lithonia Reloc System. Lithonia Reloc System can be installed less this option with connectors provided by others. Access above ceiling required. For compatible Reloc Systems, refer to options and accessories tab.
							QDS Quick Disconnect for easy ballast replacement. Not available with EL or ELR option.
							CWW Corner wallwash.
							DWW Double wallwash.
							CP Chicago Plenum (consult factory).
							CSA CSA Certified.

NOTES:
1 Not recommended for use with compact fluorescent lamp. Consult factory.
2 Multi-volt electronic ballast capable of operating on any line voltage between 120-277 volt.
3 Consult factory for specific availability.

MW

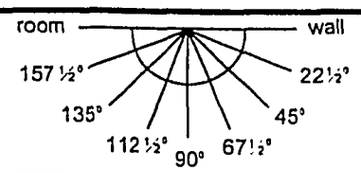
NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.



6" AFW Wallwash

TECHNICAL INFORMATION

Footcandle values are initial and tables are based on minimum of six units. For fixture-to-wall distance other than those shown, use maximum of one- to-one spacing (distance between fixtures not more than distance to wall) for best results.



AFW 1/18TRT 6AR

(1) CF18DT/E/IN/835 lamp
1200 total rated lumens
Test no. LTL9673

Candlepower data

Vertical angle	Plane angle: Room side					Wall side			
	Room	157½°	135°	112½°	90°	67½°	45°	22½°	Wall
0°	344	344	344	344	344	344	344	344	344
5°	389	379	368	356	346	340	335	330	330
15°	425	410	416	413	373	347	300	265	257
25°	405	401	398	376	344	310	264	234	219
35°	266	269	267	265	249	228	225	203	197
45°	231	235	229	223	201	180	201	200	195
55°	12	14	14	14	20	56	101	123	136
65°	2	2	2	2	7	27	51	62	64
75°	1	1	1	1	2	9	19	22	22
85°	0	0	0	0	0	1	3	3	3
95°	0	0	0	0	0	0	0	0	0

Footcandle values

	Luminaire 3' from wall on 3' centers	Luminaire 3' from wall on 4' centers
1	4 4 4	4 3 4
2	11 10 11	9 7 9
3	12 13 13	10 9 10
4	10 11 11	7 9 7
5	8 8 9	7 6 7
6	6 7 6	5 5 5
7	5 5 5	4 4 4
8	4 4 4	3 3 3
9	3 3 3	3 3 3
10	3 3 3	2 2 2

AFW 1/26TRT 6AR

(1) CF26DT/E/IN/830 lamp
1800 total rated lumens
Test no. LTL9669

Candlepower data

Vertical angle	Plane angle: Room side					Wall side			
	Room	157½°	135°	112½°	90°	67½°	45°	22½°	Wall
0°	542	542	542	542	542	542	542	542	542
5°	606	606	602	592	574	551	535	519	517
15°	676	663	662	679	584	563	469	421	406
25°	666	659	629	584	522	481	418	367	345
35°	405	406	402	404	381	353	347	325	318
45°	333	339	328	319	293	269	305	312	307
55°	18	19	19	21	28	84	152	191	213
65°	4	4	4	3	9	40	79	96	100
75°	2	2	2	2	3	14	29	34	35
85°	0	0	0	0	0	1	4	5	5
95°	0	0	0	0	0	0	0	0	0

Footcandle values

	Luminaire 3' from wall on 3' centers	Luminaire 3' from wall on 4' centers
1	7 6 7	5 4 5
2	17 16 18	15 11 15
3	19 20 19	15 14 15
4	16 17 17	12 14 12
5	13 13 14	10 10 10
6	9 11 10	8 8 8
7	8 8 8	6 7 6
8	6 6 7	5 5 5
9	5 5 5	4 4 5
10	4 4 4	3 4 4

AFW 1/32TRT 6AR

(1) CF32DT/E/IN/830 lamp
2400 total rated lumens
Test no. LTL9668

Candlepower data

Vertical angle	Plane angle: Room side					Wall side			
	Room	157½°	135°	112½°	90°	67½°	45°	22½°	Wall
0°	650	650	650	650	650	650	650	650	650
5°	745	739	727	707	679	653	630	608	605
15°	820	814	810	774	701	635	548	504	493
25°	839	827	796	731	633	565	486	424	396
35°	497	497	496	490	455	423	409	371	353
45°	408	414	406	412	366	333	370	366	355
55°	24	26	25	26	36	101	186	242	272
65°	5	5	4	4	12	48	93	118	124
75°	3	2	2	3	4	17	35	41	41
85°	0	0	0	0	0	1	5	5	6
95°	0	0	0	0	0	0	0	0	0

Footcandle values

	Luminaire 3' from wall on 3' centers	Luminaire 3' from wall on 4' centers
1	8 7 8	7 5 7
2	22 20 22	18 13 18
3	23 24 23	18 17 18
4	19 20 19	13 16 13
5	15 15 16	12 11 12
6	11 12 12	9 9 10
7	9 10 10	7 8 7
8	7 8 8	6 6 6
9	6 6 6	5 5 5
10	5 5 5	4 4 5

AFW 1/42TRT 6AR

(1) CF42DT/E/IN/830 lamp
3200 total rated lumens
Test no. LTL9670

Candlepower data

Vertical angle	Plane angle: Room side					Wall side			
	Room	157½°	135°	112½°	90°	67½°	45°	22½°	Wall
0°	827	827	827	827	827	827	827	827	827
5°	927	920	906	882	851	826	806	786	783
15°	1104	1073	1044	1004	876	832	730	680	671
25°	1088	1083	1034	931	809	751	652	578	545
35°	670	679	685	676	627	586	550	487	463
45°	538	547	543	539	476	435	486	492	482
55°	30	34	33	31	40	131	243	320	358
65°	6	6	6	6	16	63	124	159	169
75°	4	4	4	4	5	22	47	56	57
85°	0	0	0	0	1	2	6	6	8
95°	0	0	0	0	0	0	0	0	0

Footcandle values

	Luminaire 3' from wall on 3' centers	Luminaire 3' from wall on 4' centers
1	11 10 11	9 6 9
2	29 26 29	24 17 24
3	30 32 31	24 23 24
4	25 26 25	17 22 18
5	20 20 21	16 15 16
6	15 17 16	13 12 13
7	12 13 13	10 11 10
8	10 10 11	8 9 8
9	8 8 9	8 9 8
10	6 7 7	5 6 6

NOTES:

1 For electrical characteristics, refer to electrical data tab.
2 Tested to current IES and NEMA standards under stabilized laboratory conditions. Various operating factors can cause differences between laboratory data and actual field measure ments. Dimensions and specifications are based on the most current available data and are subject to change without notice.

Energy (Calculated in accordance with NEMA Standard LE-5)

LER.DOL	ANNUAL* ENERGY COST	LAMP DESCRIPTION	LAMP LUMENS	BALLAST FACTOR	INPUT WATTS
38	$6.33	1/26TRT	1800	0.98	27

* Comparative yearly lighting energy cost per 1,000 lumens

LITHONIA LIGHTING
An AcuityBrands Company

Sheet #: AFW 6 TRT

AFW 6 TRT.p65 © 2002 Acuity Lighting Group, Inc. 02/02

Lithonia Lighting
Acuity Lighting Group, Inc.
Architectural Indoor Lighting
One Lithonia Way, Conyers, GA 30012-3957
Phone: 800-315-4982 Fax: 770-860-3129
In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

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P, P1

LITHONIA LIGHTING

Catalog Number	
Notes	Type

All Purpose Wall Bracket

WC

2', 3' or 4' Lengths
1 or 2 Lamps

FEATURES & SPECIFICATIONS

INTENDED USE

For wall or ceiling mount – vertical or horizontal. Ideal for stairwells, corridors, lavatories or any utility application.

ATTRIBUTES

Easy maintenance design for individual or row mounting.

CONSTRUCTION

Heavy-duty code grade steel. Metal parts are die-formed.

FINISH

Five-stage iron-phosphate pretreatment ensures superior paint adhesion and rust resistance. Standard finish is high-gloss, baked white enamel (architectural black available).

OPTICAL SYSTEM

Available with high performance A12 pattern clear acrylic or low brightness matte white opal acrylic. Front metal fascia eliminates direct illumination.

ELECTRICAL SYSTEM

CSA listed. AWM, TFN or THHN wire used throughout, rated for required temperatures.

INSTALLATION

End caps spring-loaded for easy diffuser removal.

LISTING

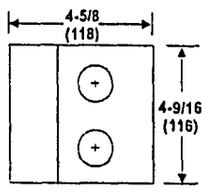
Listed and labeled to comply with Canadian Standards.

WARRANTY

Guaranteed for one year against mechanical defects in manufacture.

Specifications

Length: 24 (609), 36 (914) or 48 (1218)
Width: 4-5/8 (118)
Depth: 4-9/16 (116)
Weight: 14 lbs. (6.3 kg)



ORDERING INFORMATION

Example: **WC 2 32 120 GEB CSA**

277

WC	2	32	A12	120	GEB
Series	**Number of lamps**	**Lamp type**	**Diffuser type**	**Voltage**	**Options**
WC All Purpose Wall Bracket	1, 2 Not included.	17 17W T8 (24")	(blank) Matte white opal acrylic	120, 347, MVOLT[1] Others available.	CO Grounded convenience outlet, 120V only (lower right)[2]
		20 20W TS T12 (24")	A12 #12 pattern acrylic		S1 Pull-chain switch; installed bottom left; *on/off* operation of all lamps only (120V only)[2]
		25 25W T8 (36")	FAC Matte white opal acrylic with front metal fascia		GEB Electronic ballasts, ≤20% THD
		30 30W T12 (36")	FA12 #12 pattern acrylic with front metal fascia		GEB10IS Electronic ballasts, ≤10% THD, Instant Start
		32 32W T8 (48")			GEB10RS Electronic ballasts, ≤10% THD, Rapid Start
		40 40W T12 (48")			ES Energy saving ballasts
					MB Architectural black finish
					CSA Listed and labeled to comply with Canadian Standards

NOTES:
1 MVOLT (120/277) available with GEB10IS only.
2 For optional locations, consult factory.

TYPE P, P1, PE

P P1

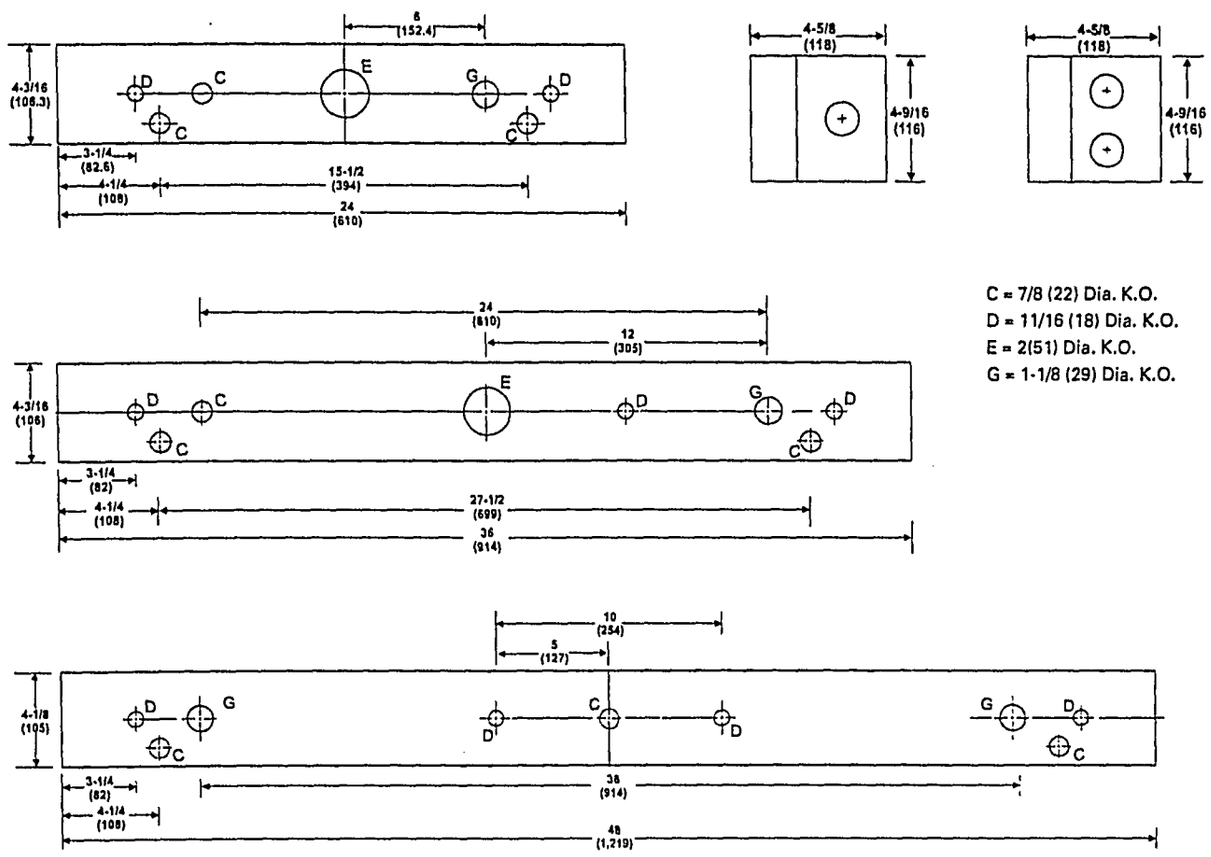
NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

WC Wall Bracket, All Purpose

MOUNTING DATA

DIMENSIONS

Inches (millimeters). Subject to change without notice.



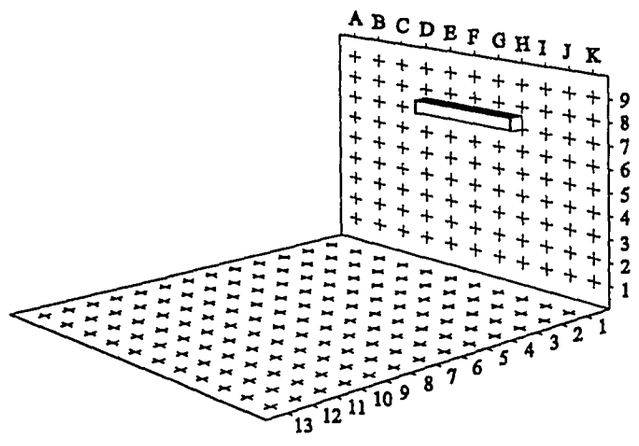
C = 7/8 (22) Dia. K.O.
D = 11/16 (18) Dia. K.O.
E = 2(51) Dia. K.O.
G = 1-1/8 (29) Dia. K.O.

PHOTOMETRICS

Calculated using the zonal cavity method in accordance with IESNA LM41 procedure. Vertical and horizontal illuminance is calculated with fixture mounting 7' above floor. Reflectances 80/50/20%. Full photometric data available upon request.

WC 2 32 GEB CSA
Report LTL 5736
Initial point illuminance on wall and horizontal work surface (fc)
X and Y coordinates are on 12" centers.

	X	A	B	C	D	E	F	G	H	I	J	K
	9	3	4	6	11	15	16	15	11	6	4	4
	8	3	4	6	18	31	33	31	18	6	4	3
	7	2	3	3						3	3	2
	6	2	3	5	16	28	30	28	16	5	3	2
Vert.	5	2	2	4	6	8	9	8	6	4	3	2
	4	2	2	3	3	4	4	4	4	3	2	2
	3	2	2	2	3	3	3	3	3	2	2	2
	2	1	2	2	2	2	2	2	2	2	2	1
	1	1	2	2	2	2	2	2	2	2	2	1
	Y											
	1	6	7	8	9	10	10	10	9	8	6	5
	2	6	7	8	10	11	11	11	10	9	7	6
	3	6	7	8	10	11	11	11	10	9	7	7
	4	7	7	8	10	11	11	11	10	9	8	7
	5	6	7	8	9	10	10	10	9	9	7	7
Horiz.	6	6	7	7	9	9	9	9	9	8	7	6
	7	5	6	6	7	7	7	7	7	7	6	5
	8	5	5	6	6	7	7	7	6	6	5	5
	9	5	5	5	6	6	6	6	6	6	5	5
	10	4	4	4	4	5	5	5	4	4	4	4
	11	3	3	4	4	4	4	4	4	4	3	3
	12	3	3	3	4	4	4	4	4	4	3	3
	13	2	2	3	3	3	3	3	3	3	2	2



NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

LITHONIA LIGHTING

WC-C

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WC-C.P65

Lithonia Lighting
Fluorescent
One Lithonia Way, Conyers, GA 30012-3957
Phone: 800-858-7763 Fax: 770-929-8789
In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

Catalog Number	Type
	Q

FEATURES

LENS

- Flat fresnel glass lens (FFL).

DOOR

- Regressed white, flush white or stepped black baffle door frame.
- Retained by two self-aligning, constant tension support springs.

REFLECTOR

- Semi-specular anodized reflector.

HOUSING

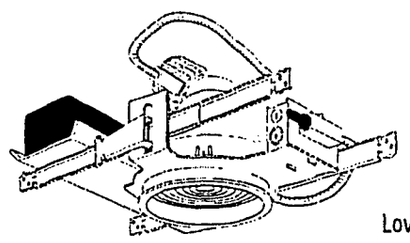
- 16-gauge galvanized steel mounting/plaster frame. Maximum 1-1/2" ceiling thickness.
- Expandable, self-locking mounting bars provide horizontal and vertical adjustment.
- Galvanized steel junction box with bottom-hinged access covers and spring latches. Two combination 1/2"-3/4" knockouts and four 1/2" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out) No. 12 AWG conductors, rated for 75°C.

ELECTRICAL SYSTEM

- Die-cast aluminum socket housing for effective heat dissipation.
- Medium base porcelain socket with nickel plated screw shell.
- Prewired, encased-and-potted, 120/277V or 120/347V ballast tray module. Module can be attached before or after mounting of mounting/plaster frame.
- Thermally-activated insulation detector.

LISTING

- Fixtures are UL listed for thru-branch wiring, recessed mounting and wet locations. Listed and labeled to comply with Canadian Standards (see options).

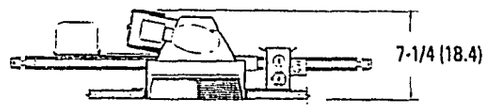


H.I.D. Downlights

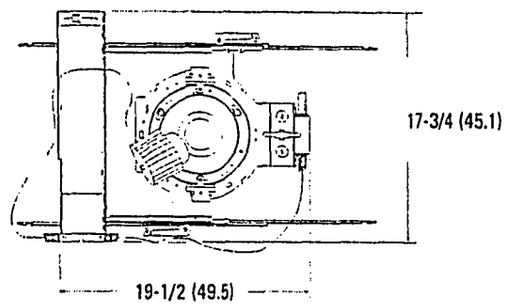
7" LGHZ

Round Lens

Wet Location
Low Profile with Flat Fresnel Lens
MH or HPS Lamps



Aperture:	7-1/8 (18.1)
Ceiling opening:	8-1/8 (20.6)
Overlap trim:	8-5/8 (21.9)



All dimensions are inches (centimeters).

ENERGY

LER.DLL	Annual Energy Cost	Lamps	Lamp Lumens	Ballast Factor	Input Watts
31	$7.63	100M	7900	1.00	125

Calculated in accordance with NEMA standard LE-5.

ORDERING INFORMATION

Example: **LGHZ 100M 7RW FFL 120 WLP**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog numbers (shipped separately).

LGHZ | 100M | 7RW | FFL | 277 |

Series

LGHZ

Wattage/Lamp

Metal Halide
- **50M** MH50/C/U/MED
- **70M** MH70/C/U/MED
- **100M** MH100/C/U/MED

Color-Corrected Metal Halide[1]
- **70MHC** MPC70/C/MED
- **100MHC** MPC100/C/MED

High Pressure Sodium
- **50S** LU50/D/MED
- **70S** LU70/D/MED
- **100S** LU100/D/MED

Door frame

- **7RW** Regressed white
- **7SB** Stepped black baffle
- **7FW** Flush white door

Shielding

- **FFL** Flat fresnel lens

Voltage

- **120**
- **277**
- **347**

Options

- **WLP** With lamp. (shipped separately)
- **LRC[2]** Provides compatibility with Lithonia RelocSystem. Lithonia Reloc System can be installed less this option with connectors provided by others. Access above ceiling required.
- **TRDA** Tamper-resistant door assembly (includes two tamper-resistant screws). For added protection, use in combination with PCL option. Not available with flush white door frame.
- **SF** Single fuse.
- **PCL** Clear polycarbonate lens installed in addition to standard lens.
- **CSA** Listed and labeled to comply with Canadian Standards.

Accessories

- **SC7** Sloped ceiling adaptor. Degree of slope must be specified (10D, 15D, 20D, 25D, 30D.) Ex: SC7 10D.

NOTES
1. Ceramic arc tube consistent-color lamp. Philips MasterColor or GE ConstantColor.
2. For compatible Reloc Systems, refer to options and accessories tab.

LITHONIA LIGHTING
ARCHITECTURAL INDOOR LIGHTING

232-LGHZ7

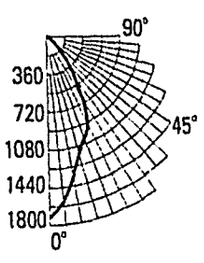
Q

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

7" LGHZ Low Profile Round Lens, Gotham Series

Distribution curve	Distribution data	Output data	Coefficient of utilization	Illuminance Data at 30" Above Floor for a Single Luminaire

LGHZ 50M 7RW FFL, (1) MP50/C/U/MED lamp, 3000 rated lumens, 0.7 s/mh, test no. 2195021110



From 0°	cp.	Lumens
0°	1727	0
5°	1568	150
15°	1148	325
25°	906	419
35°	463	291
45°	195	151
55°	92	83
65°	47	47
75°	23	24
85°	3	3
90°	0	0

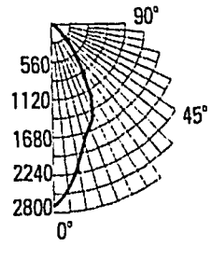
Zone	Lumens	%lamp
0°-30°	894	29.8
0°-40°	1185	39.5
0°-60°	1419	47.3
0°-90°	1493	49.8
90°-180°	0	0.0
0°-180°	1493	49.8

*Efficiency

pf / pc / pw	80% 50%	80% 30%	20% 50% 70%	20% 50% 30%	20% 30% 50%	20% 30% 30%
1	54	52	52	50	49	48
2	49	47	49	45	45	44
3	45	42	46	41	42	40
4	42	39	43	38	39	37
5	39	35	41	35	36	34
6	36	33	39	32	34	32
7	34	30	37	30	32	29
8	31	28	35	28	30	27
9	30	26	33	26	28	26
10	28	25	31	24	27	24

Mount height	Initial fc at beam center	50% beam angle 39.1° Beam diameter	50% beam angle 39.1° fc at beam edge	10% beam angle 76.1° Beam diameter	10% beam angle 76.1° fc at beam edge
8'	57.1	3.9'	28.5	8.6'	5.7
10'	30.7	5.3'	15.3	11.7'	3.1
12'	19.1	6.7'	9.6	14.9'	1.9
14'	13.1	8.2'	6.5	18.0'	1.3
16'	9.5	9.6'	4.7	21.1'	0.9

LGHZ 70M 7RW FFL, (1) MP70/C/U/MED lamp, 4700 rated lumens, 0.7 s/mh, test no. 2195021109



From 0°	cp.	Lumens
0°	2706	0
5°	2456	234
15°	1797	509
25°	1420	657
35°	725	455
45°	306	237
55°	145	130
65°	74	73
75°	35	37
85°	5	5
90°	0	0

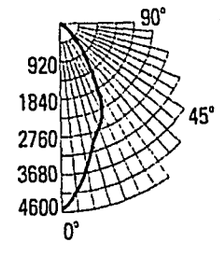
Zone	Lumens	%lamp
0°-30°	1401	29.8
0°-40°	1857	39.5
0°-60°	2224	47.3
0°-90°	2340	49.8
90°-180°	0	0.0
0°-180°	2340	49.8*

*Efficiency

pf / pc / pw	80% 50%	80% 30%	20% 50% 70%	20% 50% 30%	20% 30% 50%	20% 30% 30%
1	54	52	52	50	49	48
2	49	47	49	45	45	44
3	45	42	46	41	42	40
4	42	39	43	38	39	37
5	39	35	41	35	36	34
6	36	33	39	32	34	32
7	34	30	37	30	32	29
8	31	28	35	28	30	27
9	30	26	33	26	28	26
10	28	25	32	24	27	24

Mount height	Initial fc at beam center	50% beam angle 39.1° Beam diameter	50% beam angle 39.1° fc at beam edge	10% beam angle 76.1° Beam diameter	10% beam angle 76.1° fc at beam edge
8'	89.5	3.9'	44.7	8.6'	8.9
10'	48.1	5.3'	24.1	11.7'	4.8
12'	30.0	6.7'	15.0	14.9'	3.0
14'	20.5	8.2'	10.2	18.0'	2.0
16'	14.8	9.6'	7.4	21.1'	1.5

LGHZ 100M 7RW FFL, (1) MP100/C/U/MED lamp, 7900 rated lumens, 0.7 s/mh, test no. 2195020803



From 0°	cp.	Lumens
0°	4548	0
5°	4128	394
15°	3021	856
25°	2387	1105
35°	1219	766
45°	514	398
55°	244	219
65°	125	124
75°	60	63
85°	9	10
90°	0	0

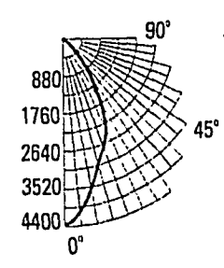
Zone	Lumens	%lamp
0°-30°	2355	29.8
0°-40°	3121	39.5
0°-60°	3738	47.3
0°-90°	3935	49.8
90°-180°	0	0.0
0°-180°	3935	49.8*

*Efficiency

pf / pc / pw	80% 50%	80% 30%	20% 50% 70%	20% 50% 30%	20% 30% 50%	20% 30% 30%
1	54	52	52	50	49	48
2	49	47	49	45	45	44
3	45	42	46	41	42	40
4	42	39	43	38	39	37
5	39	35	41	35	36	34
6	36	33	39	32	34	32
7	34	30	37	30	32	29
8	31	28	35	28	30	27
9	30	26	33	26	28	26
10	28	25	32	24	27	24

Mount height	Initial fc at beam center	50% beam angle 39.1° Beam diameter	50% beam angle 39.1° fc at beam edge	10% beam angle 76.1° Beam diameter	10% beam angle 76.1° fc at beam edge
8'	150.3	3.9'	75.2	8.6'	15.0
10'	80.9	5.3'	40.4	11.7'	8.1
12'	50.4	6.7'	25.2	14.9'	5.0
14'	34.4	8.2'	17.2	18.0'	3.4
16'	25.0	9.6'	12.5	21.1'	2.5

LGHZ 100M 7SB FFL, (1) MP100/C/U/MED lamp, 7900 rated lumens, 0.7 s/mh, test no. 2195020703



From 0°	cp.	Lumens
0°	4357	0
5°	4086	390
15°	3050	865
25°	2328	1078
35°	1146	720
45°	403	312
55°	129	116
65°	40	40
75°	3	3
85°	0	0
90°	0	0

Zone	Lumens	%lamp
0°-30°	2332	29.5
0°-40°	3052	38.6
0°-60°	3480	44.1
0°-90°	3523	44.6
90°-180°	0	0.0
0°-180°	3523	44.6*

*Efficiency

pf / pc / pw	80% 50%	80% 30%	20% 50% 70%	20% 50% 30%	20% 30% 50%	20% 30% 30%
1	49	48	47	45	44	44
2	45	43	44	41	42	40
3	42	39	42	38	39	37
4	39	36	40	35	36	35
5	36	33	38	33	34	32
6	34	31	36	30	32	30
7	32	29	34	28	30	28
8	30	27	33	27	28	26
9	28	25	31	25	27	25
10	26	24	30	23	25	23

Mount height	Initial fc at beam center	50% beam angle 40.6° Beam diameter	50% beam angle 40.6° fc at beam edge	10% beam angle 75.2° Beam diameter	10% beam angle 75.2° fc at beam edge
8'	144.0	4.1'	72.0	8.5'	14.4
10'	77.5	5.5'	38.7	11.6'	7.7
12'	48.3	7.0'	24.1	14.6'	4.8
14'	32.9	8.5'	16.5	17.7'	3.3
16'	23.9	10.0'	12.0	20.8'	2.4

Notes:
1. For electrical characteristics consult technical data tab.
2. Tested to current IES and NEMA standards under stabilized laboratory conditions. Various operating factors can cause differences between laboratory data and actual field measurements. Dimensions and specifications are based on the most current available data and are subject to change without notice.

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

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LITHONIA LIGHTING
ARCHITECTURAL INDOOR LIGHTING
ONE LITHONIA WAY, CONYERS, GEORGIA 30012, TELEPHONE 770-922-9000, FAX 770-860-3129
www.lithonia.com • IN CANADA: 1100 55TH AVE., LACHINE, QUEBEC H8T 2V3

5A, 5A3

LITHONIA LIGHTING

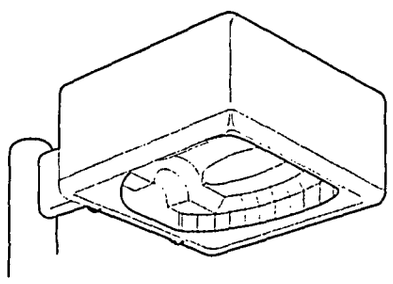
Catalog Number	
Notes	Type

Soft Square Cutoff Lighting

CONTOUR SERIES

KAD

METAL HALIDE
100W, 150W, 175W, 200W,
250W, 320W, 350W, 400W
20' to 35' Mounting



FEATURES & SPECIFICATIONS

INTENDED USE — Ideal for parking areas, street lighting, walkways and car lots.

CONSTRUCTION — Rugged, die-cast, soft corner aluminum housing with 0.12" nominal wall thickness. Extruded 4" soft corner arm for pole or wall mounting is standard. Die-cast door frame has impact-resistant, tempered, glass lens that is fully gasketed with one-piece tubular silicone.

FINISH — Standard finish is dark bronze (DDB) polyester powder finish, with other architectural colors available.

OPTICAL SYSTEM — Anodized, aluminum hydroformed reflectors: IES full cutoff distributions R2 (asymmetric), R3 (asymmetric), R4 (forward throw) and R5S (square). High performance anodized, segmented aluminum reflectors IES full cutoff distributions SR2 (asymmetric), SR3 (asymmetric) and SR4SC (forward throw, sharp cutoff). Segmented reflectors attach with tool-less fasteners and are rotatable and interchangable.

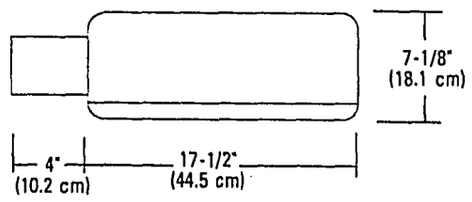
ELECTRICAL SYSTEM — High reactance, high power factor ballast for 100W/150W. Constant-wattage autotransformer for 175-400W. Super CWA Pulse Start ballast required for 200W, 320W and 350W (must order SCWA option).Ballast is copper-wound and 100% factory-tested.

Porcelain, horizontal, position-oriented, socket with copper alloy, nickel-plated screw shell and center contact. Medium-base socket used with 100W & 150W, mogul-base socket used with 175-400W. UL listed 1500W-600V.

LISTING — UL 1572 listed for wet locations. Listed and labeled to comply with Canadian Standards (see Options).

Standard Dimensions

EPA: 1.2 ft.²
Weight: 41 lbs (18.6 kg)
Length: 17-1/2" (44.5 cm)
Width: 17-1/2" (44.5 cm)
Depth: 7-1/8" (18.1 cm)



ORDERING INFORMATION

Example: **KAD 400M R2 120 SPD04**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog number.

KAD 400M R4 277 DAD 12P DDB

Series	Voltage	Mounting	Options
KAD 100M	**120**	**SPD04** Square pole (4" arm) (standard)	**Shipped Installed In Fixture**
KAD 150M	**208**[3]	**SPD09** Square pole (9 " arm)[5]	**SF** Single fuse (120, 277, 347V, n/a TB)
KAD 175M	**240**[3]	**RPD04** Round pole (4" arm)	**DF** Double fuse (208, 240, 480V, n/a TB)
KAD 200M	**277**	**RPD09** Round pole (9" arm)[5]	**PER** NEMA twist-lock receptacle only (no photocontrol)
KAD 250M	**347**	**WWD04** Wood pole or wall (4" arm)	**LPI** Lamp included
KAD 320M[1]	**480**[3]	**WWD09** Wood pole or wall (9" arm)[5,6]	**PD** Power Tray[10]
KAD 350M[1]	**TB**[4]	**WBD04** Wall bracket (4" arm)[6]	**WTB** Terminal Wiring Block[10]
KAD 400M[1]		**WBD09** Wall bracket (9" arm)[6]	**QRS** Quartz restrike system (250W maximum, lamp not included)[7]
		L/Arm (When ordering KMA, DAD12)	**CSA** Listed and labeled to comply with Canadian Standards
		Shipped Separately	**SCWA** Super CWA Pulse Start Ballast (n/a 100W & 175W)
		KMA Mast arm adapter	**Shipped Separately**[6]
		KTMB Twin mounting bar	**PE1** NEMA twist-lock PE (120, 208, 240V)
		DAD12P Degree Arm (pole)	**PE3** NEMA twist-lock PE (347V)
		DAD12WB Degree Arm (wall)	**PE4** NEMA twist-lock PE (480V)
			PE7 NEMA twist-lock PE (277V)
			HS House side shield (R2,R3, R4) (SR2, SR3)
			KADVG Vandal guard
			KADWG Wire guard

Architectural Colors[8]
Standard Colors
DDB Dark bronze (standard)
DWH White
DBL Black
Classic Colors
DMB Medium bronze
DNA Natural aluminum
DSS Sandstone
DGC Charcoal gray
DTG Tennis green
DBR Bright red
DSB Steel blue

Distribution

Hydroformed Reflectors
R2 IES type II asymmetric[2]
R3 IES type III asymmetric[2]
R4 IES type IV forward throw[2]
R5S IES type V square

Segmented Reflectors
SR2 IES type II asymmetric[2]
SR3 IES type III asymmetric[2]
SR4SC IES type IV forward throw

NOTES:
1 Reduced jacket ED28 lamp must be used with SR2, SR3 & SR4SC optics.
2 House side shield available.
3 Consut factory for availability in Canada.
4 Optional multi-tap ballast (120, 208, 240, 277V).
5 The SPD09, RPD09 or WWD09 must be used when two or more luminaires are oriented on a 90° drilling pattern.
6 May be ordered as accessory.
7 QRSTD available in select wattages; consult factory.
8 Additional architectural colors available; please see Architectural Colors brochure, form no. 794.3.
9 Must use RPD09.
10 Only available with SR2, SR3 and SR4SC optics.

Accessories: Tenon Mounting Slipfitter

Order as separate catalog number.

Tenon O.D.	Number of fixtures: One	Two@180°	Two@90°	Three@120°	Three@90°	Four@90°
2-3/8"	T20-190	T20-280	T20-290[9]	T20-320[9]	T20-390[9]	T20-490[9]
2-7/8"	T25-190	T25-280	T25-290[9]	T25-320	T25-390[9]	T25-490[9]
4"	T35-190	T35-280	T35-290[9]	T35-320	T35-390[9]	T35-490[9]

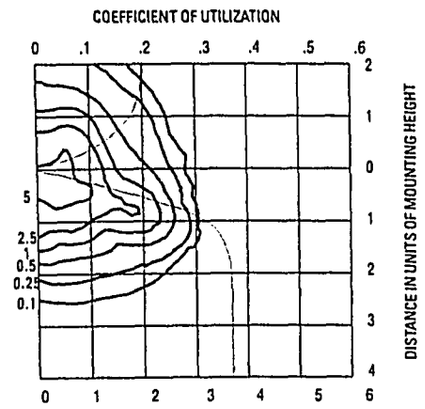
5A, 5A3

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

KAD 400M Arm-mounted Soft Square Cutoff

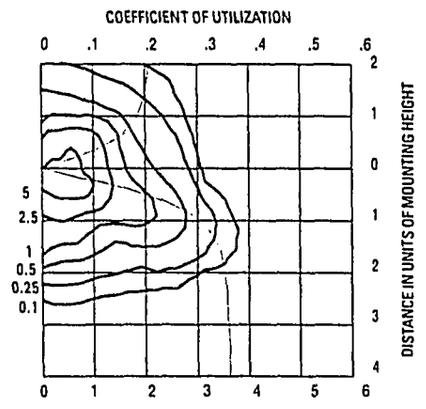
Coefficient of Utilization ———
Initial Footcandles ———

KAD R2 Test no. 1193083101



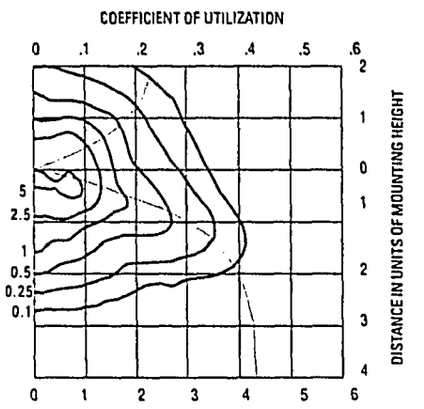
400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type II, cutoff.

KAD R3 Test no. 1192040902



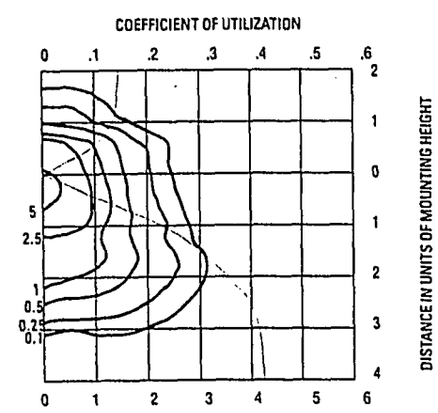
400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type III, cutoff.

KAD R3 RJ Test no. 1192041502



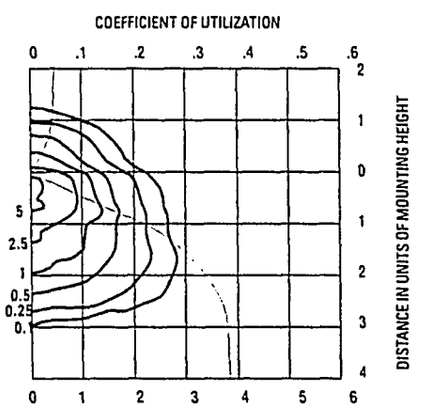
400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type III, cutoff.

KAD R4 Test no. 1191110101



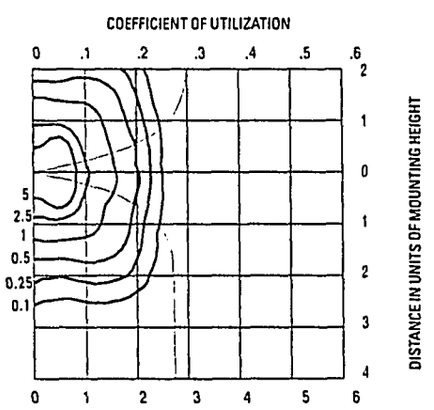
400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type IV, cutoff.

KAD R4HS Test no. 1192061101



400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type IV, cutoff.

KAD R5S Test no. 1193111901



400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type V, cutoff.

Electrical Characteristics

Wattage/ballast	Primary voltage	Line current (Amps) Start/Operating	Primary dropout voltage	Input watts	Power factor (%)	Regulation Line V = Lamp lumens
400CWA Peak-lead Autotransformer	120	2.50/4.00	55	455	90+	±10% = ±10%
	208	1.45/2.30	95			
	240	1.25/2.00	110			
	277	1.10/1.75	125			
	480	.73/1.00	225			

Tested to current IES and NEMA standards under stabilized laboratory conditions. Various operating factors can cause differences between laboratory data and actual field measurements. Dimensions and specifications on this sheet are based on the most current available data and are subject to change without notice.

Mounting Height Correction Factor
(Multiply the fc level by the correction factor)
25 ft. = 1.44
35 ft. = 0.73
40 ft. = .56

$$\left(\frac{\text{Existing Mounting Height}}{\text{New Mounting Height}}\right)^2 = \text{Correction Factor}$$

Notes:
1 Photometric data for other distributions can be accessed from the Lithonia Lighting website. (www.lithonia.com)

LITHONIA LIGHTING
An AcuityBrands Company

KAD-M

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Lithonia Lighting
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In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

SG

LITHONIA LIGHTING

Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

INTENDED USE — Ideal for parking areas, street lighting, walkways and car lots.

CONSTRUCTION — Rugged, die-cast, soft corner aluminum housing with 0.12" nominal wall thickness. Extruded 4" soft corner arm for pole or wall mounting is standard. Die-cast door frame has impact-resistant, tempered, glass lens that is fully gasketed with one-piece tubular silicone.

FINISH — Standard finish is dark bronze (DDB) polyester powder finish, with other architectural colors available.

OPTICAL SYSTEM — Anodized, aluminum hydroformed reflectors: IES full cutoff distributions R2 (asymmetric), R3 (asymmetric), R4 (forward throw) and R5S (square). High performance anodized, segmented aluminum reflectors IES full cutoff distributions SR2 (asymmetric), SR3 (asymmetric) and SR4SC (forward throw, sharp cutoff). Segmented reflectors attach with tool-less fasteners and are rotatable and interchangable.

ELECTRICAL SYSTEM — High reactance, high power factor ballast for 100W/150W. Constant-wattage autotransformer for 175-400W. Super CWA Pulse Start ballast required for 200W, 320W and 350W (must order SCWA option).Ballast is copper-wound and 100% factory-tested.

Porcelain, horizontal, position-oriented, socket with copper alloy, nickel-plated screw shell and center contact. Medium-base socket used with 100W & 150W, mogul-base socket used with 175-400W. UL listed 1500W-600V.

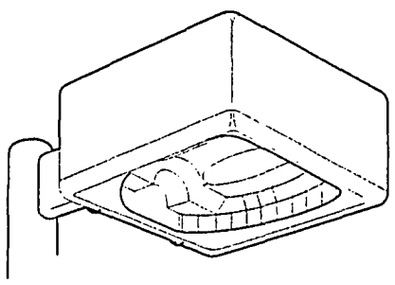
LISTING — UL 1572 listed for wet locations. Listed and labeled to comply with Canadian Standards (see Options).

Soft Square Cutoff Lighting

CONTOUR SERIES

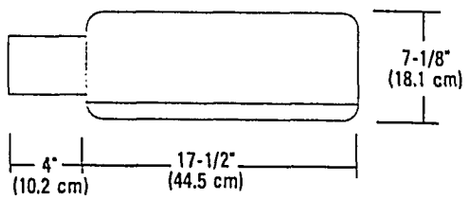
KAD

METAL HALIDE
100W, 150W, 175W, 200W,
250W, 320W, 350W, 400W
20' to 35' Mounting



Standard Dimensions

EPA: 1.2 ft.²
Weight: 41 lbs (18.6 kg)
Length: 17-1/2" (44.5 cm)
Width: 17-1/2" (44.5 cm)
Depth: 7-1/8" (18.1 cm)



ORDERING INFORMATION

Example: **KAD 400M R2 120 SPD04**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog number.

KAD 400M | R3 | 277 | DAD 12P | DDB

Series

KAD 100M
KAD 150M
KAD 175M
KAD 200M
KAD 250M
KAD 320M[1]
KAD 350M[1]
KAD 400M[1]

Voltage

120
208[3]
240[3]
277
347
480[3]
TB[4]

Mounting

SPD04 Square pole (4" arm) (standard)
SPD09 Square pole (9 " arm)[5]
RPD04 Round pole (4" arm)
RPD09 Round pole (9" arm)[5]
WWD04 Wood pole or wall (4" arm)
WWD09 Wood pole or wall (9" arm)[5,6]
WBD04 Wall bracket (4" arm)[6]
WBD09 Wall bracket (9" arm)[6]
L/Arm (When ordering KMA, DAD12)

Shipped Separately

KMA Mast arm adapter
KTMB Twin mounting bar
DAD12P Degree Arm (pole)
DAD12WB Degree Arm (wall)

Options

Shipped Installed In Fixture

SF Single fuse (120, 277, 347V, n/a TB)
DF Double fuse (208, 240, 480V, n/a TB)
PER NEMA twist-lock receptacle only (no photocontrol)
LPI Lamp included
PD Power Tray[10]
WTB Terminal Wiring Block[10]
QRS Quartz restrike system (250W maximum, lamp not included)[7]
CSA Listed and labeled to comply with Canadian Standards
SCWA Super CWA Pulse Start Ballast (n/a 100W & 175W)

Shipped Separately[5]

PE1 NEMA twist-lock PE (120, 208, 240V)
PE3 NEMA twist-lock PE (347V)
PE4 NEMA twist-lock PE (480V)
PE7 NEMA twist-lock PE (277V)
HS House side shield (R2,R3, R4) (SR2, SR3)
KADVG Vandal guard
KADWG Wire guard

Architectural Colors[8]

Standard Colors

DDB Dark bronze (standard)
DWH White
DBL Black

Classic Colors

DMB Medium bronze
DNA Natural aluminum
DSS Sandstone
DGC Charcoal gray
DTG Tennis green
DBR Bright red
DSB Steel blue

Distribution

Hydroformed Reflectors

R2 IES type II asymmetric[2]
R3 IES type III asymmetric[2]
R4 IES type IV forward throw[2]
R5S IES type V square

Segmented Reflectors

SR2 IES type II asymmetric[2]
SR3 IES type III asymmetric[2]
SR4SC IES type IV forward throw

NOTES:

1 Reduced jacket ED28 lamp must be used with SR2, SR3 & SR4SC optics.
2 House side shield available.
3 Consut factory for availability in Canada.
4 Optional multi-tap ballast (120, 208, 240, 277V).
5 The SPD09, RPD09 or WWD09 must be used when two or more luminaires are oriented on a 90° drilling pattern.
6 May be ordered as accessory.
7 QRSTD available in select wattages; consult factory.
8 Additional architectural colors available; please see Architectural Colors brochure, form no. 794.3.
9 Must use RPD09.
10 Only available with SR2, SR3 and SR4SC optics.

Accessories: Tenon Mounting Slipfitter

Order as separate catalog number.

Tenon O.D.	Number of fixtures: One	Two@180°	Two@90°	Three@120°	Three@90°	Four@90°
2-3/8"	T20-190	T20-280	T20-290[3]	T20-320[9]	T20-390[9]	T20-490[9]
2-7/8"	T25-190	T25-280	T25-290[3]	T25-320	T25-390[9]	T25-490[9]
4"	T35-190	T35-280	T35-290[3]	T35-320	T35-390[9]	T35-490[9]

SG

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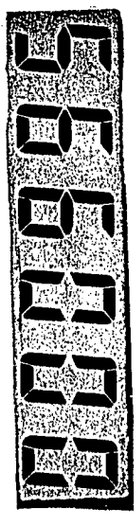
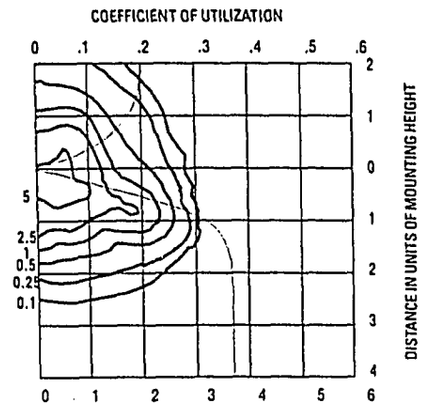


KAD 400M Arm-mounted Soft Square Cutoff

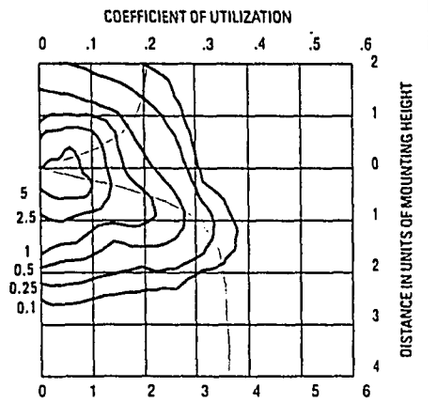
Coefficient of Utilization ———
Initial Footcandles ———

KAD R2 Test no. 1193083101



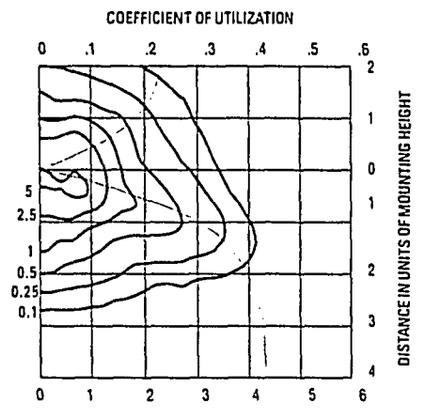
400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type II, cutoff.

KAD R3 Test no. 1192040902



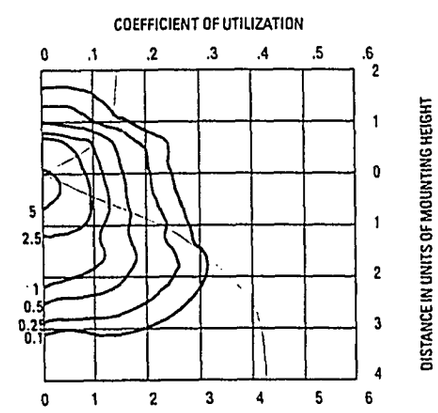
400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type III, cutoff.

KAD R3 RJ Test no. 1192041502



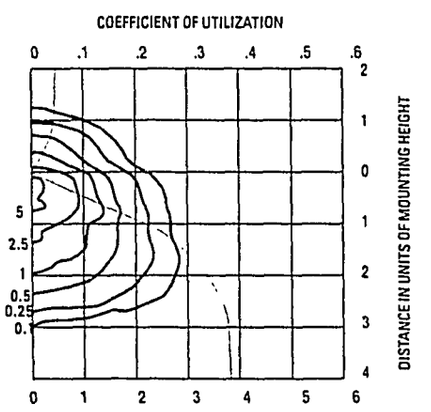
400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type III, cutoff.

KAD R4 Test no. 1191110101



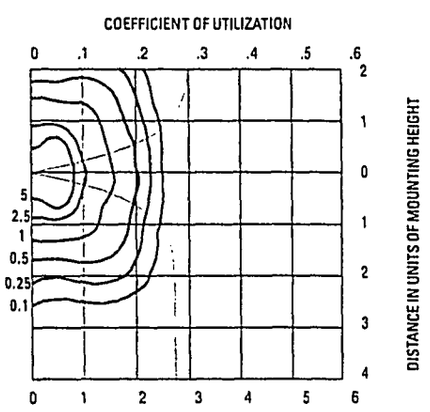
400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type IV, cutoff.

KAD R4HS Test no. 1192061101



400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type IV, cutoff.

KAD R5S Test no. 1193111901



400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type V, cutoff.

Electrical Characteristics

Wattage/ballast	Primary voltage	Line current (Amps) Start/Operating	Primary dropout voltage	Input watts	Power factor (%)	Regulation Line V = Lamp lumens
400CWA Peak-lead Autotransformer	120	2.50/4.00	55	455	90+	±10% = ±10%
	208	1.45/2.30	95			
	240	1.25/2.00	110			
	277	1.10/1.75	125			
	480	.73/1.00	225			

Tested to current IES and NEMA standards under stabilized laboratory conditions. Various operating factors can cause differences between laboratory data and actual field measurements. Dimensions and specifications on this sheet are based on the most current available data and are subject to change without notice.

Mounting Height Correction Factor
(Multiply the fc level by the correction factor)
25 ft. = 1.44
35 ft. = 0.73
40 ft. = .56

$$\left(\frac{\text{Existing Mounting Height}}{\text{New Mounting Height}}\right)^2 = \text{Correction Factor}$$

Notes:
1 Photometric data for other distributions can be accessed from the Lithonia Lighting website. (www.lithonia.com)

LITHONIA LIGHTING
An AcuityBrands Company

KAD-M

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Lithonia Lighting
Acuity Lighting Group, Inc.
Outdoor Lighting
One Lithonia Way, Conyers, GA 30012-3957
Phone: 770-922-9000 Fax: 770-918-1209
In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

LITHONIA LIGHTING

Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

CONSTRUCTION

Weldable-grade, hot-rolled, commercial-quality carbon steel tubing with a minimum yield of 55,000 psi (11-gauge), 50,000 psi (7-gauge). Uniform wall thickness of .125" or .188". Shafts are one-piece with a longitudinal electric resistance weld. Uniformly square in cross-section with flat sides, small corner radii and excellent torsion. Available shaft widths are 4", 5" and 6".

Anchor base is fabricated from hot-rolled carbon steel plate that meets or exceeds a minimum yield strength of 36,000 psi. The anchor base is provided with slotted holes. Base cover is finished to match pole.

A handhole having nominal dimensions of 3" x 5" for all shafts. Included is a cover with attachment screws.

Top cap provided with all drill-mount poles.

Fasteners are high-strength galvanized zinc-plated or stainless steel.

FINISH — Dark bronze (DDB) polyester powder standard. Other architectural colors available.

GROUNDING — A nut holder located immediately inside the handhole rim is provided with a 1/2" – 13 UNC ground bolt and nut.

ANCHOR BOLTS — Top protion of anchor bolt is galvanized per ASTM A-153. Made of steel rod having a minimum yield strength of 55,000 psi.

Anchor Base Poles

SSS

SQUARE STRAIGHT STEEL

ORDERING INFORMATION

Example: **SSS 20 5C DM19 DDB**

Choose the boldface catalog nomenclature that best suits your needs and write it in the appropriate blank.

SSS	30	5G	DM19 DM28	DDB
Shaft type	Nominal shaft length	Nominal shaft base size/ wall thickness	Mounting[1]	Options
SSS	10 – 39 feet (See back page.)	(See back page.)		

Tenon Mounting

PT	Open top
T20	2-3/8" O.D. (2" NPS)
T25	2-7/8" O.D. (2-1/2" NPS)
T30[2]	3-1/2" O.D. (3" NPS)
T35[2]	4" O.D. (3-1/2" NPS)

Drill Mounting[3]

DM19	1 at 90°
DM28	2 at 180°
DM28PL	2 at 180° with one side plugged
DM29	2 at 90°
DM39	3 at 90°
DM49	4 at 90°

Aeris Drill Mounting[3]

DM19AS	1 at 90°
DM28AS	2 at 180°
DM29AS	2 at 90°
DM39AS	3 at 90°
DM49AS	4 at 90°

Options

Shipped Installed

L/AB	Less Anchor Bolts
VD	Vibration Damper
TP	Tamper Proof
Hxx[4,5]	Horizontal Arm Bracket (1 fixture)
FDLxx[4]	Festoon Outlet less electrical
FGLxx[4]	Festoon GFI Outlet less electrical
12CPxx[4]	1/2" Coupling
34CPxx[4]	3/4" Coupling
1CPxx[4]	1" Coupling
12NPxx[4]	1/2" Threaded Nipple
34NPxx[4]	3/4" Threaded Nipple
1NPxx[4]	1" Threaded Nipple
HHxx[4,6]	Extra Handhole

Architectural Colors (powder finish)[7]

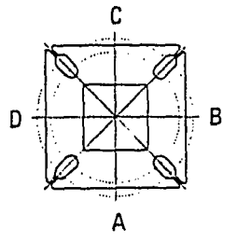
Standard Colors

DDB	Dark bronze
DWH	White
DBL	Black

Classic Colors

DMB	Medium bronze
DNA	Natural aluminum
DSS	Sandstone
DGC	Charcoal gray
DTG	Tennis green
DBR	Bright red
DSB	Steel blue
GALV	Galvanized finish

HANDHOLE ORIENTATION



Handhole

NOTES:

1 When ordering tenon mounting and drill mounting for the same pole, follow this example: DM28/T20. The combination requires an extra handhole.

2 3-1/2" and 4" tenons available on 5" and 6" shafts only.

3 The drilling template to be used for a particular luminaire depends on the luminaire that is used. Refer to the Technical Data Section of the Outdoor Binder for Drilling Templates.

4 Specify location and orientation when ordering option.
For 1st "x": Specify the height in feet above base of pole.
Example: 5ft = 5 and 20ft = 20
For 2nd "x": Specify orientation from handhole (A,B,C,D)
Refer to the Handhole Orientation diagram on this page.

5 Horizontal arm is 18" x 2-3/8" O.D. tenon standard.

6 Combination of tenon-top and drill mount requires extra handhole.

7 Additional colors available; see Architectural Colors brochure, form no. 794.3.

IMPORTANT INSTALLATION NOTES:

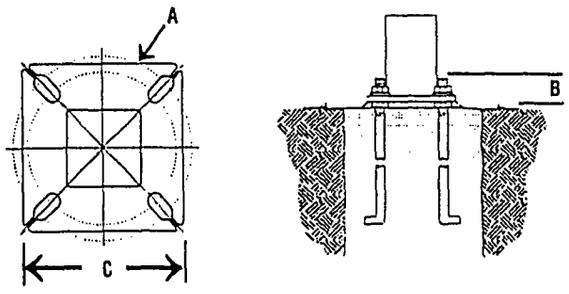
- Do not erect poles without having fixtures installed.
- Factory-supplied templates must be used when setting anchor bolts. Lithonia will not accept claim for incorrect anchorage placement due to failure to use factory template.
- If poles are stored outside, all protective wrapping must be removed immediately to prevent finish damage.
- Lithonia is not responsible for the foundation design.
- Installation requires grout to be packed under base to ensure full contact with foundation.

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

SSS Square Straight Steel Poles

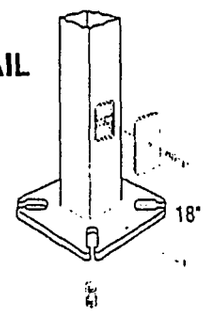
TECHNICAL INFORMATION

					EPA (ft²) with 1.3 gust								
Catalog Number	Nominal shaft length (feet)	Pole Shaft Size(in x in x ft)	Wall Thickness (inches)	Gauge	80 mph	Max. weight	90 mph	Max. weight	100 mph	Max. weight	Bolt Circle (inches)	Bolt Size (in. x in. x in.)	Approximate ship weight (pounds)
SSS 10 4C	10	4.0 x 10.0	0.125	11	30.6	765	23.8	595	18.9	473	8--9	3/4 x 18 x 3	75
SSS 12 4C	12	4.0 x 12.0	0.125	11	24.4	610	18.8	470	14.8	370	8--9	3/4 x 18 x 3	90
SSS 14 4C	14	4.0 x 14.0	0.125	11	19.9	498	15.1	378	11.7	293	8--9	3/4 x 18 x 3	100
SSS 16 4C	16	4.0 x 16.0	0.125	11	15.9	398	11.8	295	8.9	223	8--9	3/4 x 18 x 3	115
SSS 18 4C	18	4.0 x 18.0	0.125	11	12.6	315	9.2	230	6.7	168	8--9	3/4 x 18 x 3	125
SSS 20 4C	20	4.0 x 20.0	0.125	11	9.6	240	6.7	167	4.5	150	8--9	3/4 x 18 x 3	140
SSS 20 4G	20	4.0 x 20.0	0.188	7	16.5	415	12.25	310	9.3	240	8--9	3/4 x 30 x 3	198
SSS 20 5C	20	5.0 x 20.0	0.125	11	17.7	443	12.7	343	9.4	235	10--12	1 x 36 x 4	185
SSS 20 5G	20	5.0 x 20.0	0.188	7	28.1	703	21.4	535	16.2	405	10--12	1 x 36 x 4	265
SSS 25 4C	25	4.0 x 25.0	0.125	11	4.8	150	2.6	100	1.0	50	8--9	3/4 x 18 x 3	170
SSS 25 4G	25	4.0 x 25.0	0.188	7	10.8	270	7.7	188	5.4	135	8--9	3/4 x 30 x 3	245
SSS 25 5C	25	5.0 x 25.0	0.125	11	9.8	245	6.3	157	3.7	150	10--12	1 x 36 x 4	225
SSS 25 5G	25	5.0 x 25.0	0.188	7	18.0	350	12.6	350	9.0	250	10--12	1 x 36 x 4	320
SSS 30 4G	30	4.0 x 30.0	0.188	7	6.4	160	4.0	100	2.3	58	8--9	3/4 x 30 x 3	295
SSS 30 5C	30	5.0 x 30.0	0.125	11	4.7	150	2.0	50	--	--	10--12	1 x 36 x 4	265
SSS 30 5G	30	5.0 x 30.0	0.188	7	10.7	267	6.7	167	3.9	100	10--12	1 x 36 x 4	380
SSS 30 6G	30	6.0 x 30.0	0.188	7	15.7	392	10.2	257	6.4	160	11--13	1 x 36 x 4	520
SSS 35 5G	35	5.0 x 35.0	0.188	7	5.9	150	2.5	100	--	--	10--12	1 x 36 x 4	440
SSS 35 6G	35	6.0 x 35.0	0.188	7	9.5	237	5.0	150	1.8	50	11--13	1 x 36 x 4	540
SSS 39 6G	39	6.0 x 39.0	0.188	7	5.1	128	1.3	33	--	--	11--13	1 x 36 x 4	605



Shaft Base Size	Bolt Circle A	Bolt Projection B	Base Square C	Anchor Bolt Description	Warehouse Anchor Bolt Description	Template Number
4"C	8-1/2"	2-3/4"–4"	8"	ABSSS-4C	AB18-0	PJ50004
4"G	8-1/2"	2-3/4"–4"	8"	ABSSS-4G	AB30-0	PJ50004
5"	10"–12"	3-3/8"–4"	11"	ABSSS-5	AB36-0	PJ50010
6"	11"–13"	3-3/8"–4"	12-1/2"	ABSSS-6	AB36-0	PJ50011

BASE DETAIL



IMPORTANT:

- These specifications are intended for general purposes only. Lithonia reserves the right to change material or design, without prior notice, in a continuing effort to upgrade its products.

LITHONIA LIGHTING
An AcuityBrands Company

Sheet #: Pole-SSS ©1994 Lithonia Lighting, Rev. 6/02 Pole-SSS.P65

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Outdoor Lighting
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In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

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DO NOT SCALE

LITHONIA LIGHTING

Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

CONSTRUCTION

Weldable-grade, hot-rolled, commercial-quality carbon steel tubing with a minimum yield of 55,000 psi (11-gauge), 50,000 psi (7-gauge). Uniform wall thickness of .125" or .188". Shafts are one-piece with a longitudinal electric resistance weld. Uniformly square in cross-section with flat sides, small corner radii and excellent torsion. Available shaft widths are 4", 5" and 6".

Anchor base is fabricated from hot-rolled carbon steel plate that meets or exceeds a minimum yield strength of 36,000 psi. The anchor base is provided with slotted holes. Base cover is finished to match pole.

A handhole having nominal dimensions of 3" x 5" for all shafts. Included is a cover with attachment screws.

Top cap provided with all drill-mount poles.

Fasteners are high-strength galvanized zinc-plated or stainless steel.

FINISH — Dark bronze (DDB) polyester powder standard. Other architectural colors available.

GROUNDING — A nut holder located immediately inside the handhole rim is provided with a 1/2" – 13 UNC ground bolt and nut.

ANCHOR BOLTS — Top protion of anchor bolt is galvanized per ASTM A-153. Made of steel rod having a minimum yield strength of 55,000 psi.

Anchor Base Poles

SSS

SQUARE STRAIGHT STEEL

ORDERING INFORMATION

Example: **SSS 20 5C DM19 DDB**

Choose the boldface catalog nomenclature that best suits your needs and write it in the appropriate blank.

SSS	20	4G	DM19 DM28	DDB
Shaft type	Nominal shaft length	Nominal shaft base size/ wall thickness	Mounting[1]	Options
SSS	10 – 39 feet (See back page.)	(See back page.)		

Mounting[1]

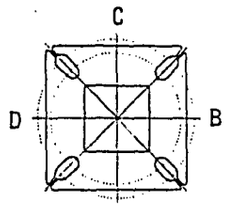
	Tenon Mounting
PT	Open top
T20	2-3/8" O.D. (2" NPS)
T25	2-7/8" O.D. (2-1/2" NPS)
T30[2]	3-1/2" O.D. (3" NPS)
T35[2]	4" O.D. (3-1/2" NPS)
	Drill Mounting[3]
DM19	1 at 90°
DM28	2 at 180°
DM28PL	2 at 180° with one side plugged
DM29	2 at 90°
DM39	3 at 90°
DM49	4 at 90°
	Aeris Drill Mounting[3]
DM19AS	1 at 90°
DM28AS	2 at 180°
DM29AS	2 at 90°
DM39AS	3 at 90°
DM49AS	4 at 90°

Options

	Shipped Installed
L/AB	Less Anchor Bolts
VD	Vibration Damper
TP	Tamper Proof
Hxx[4,5]	Horizontal Arm Bracket (1 fixture)
FDLxx[4]	Festoon Outlet less electrical
FGLxx[4]	Festoon GFI Outlet less electrical
12CPxx[4]	1/2" Coupling
34CPxx[4]	3/4" Coupling
1CPxx[4]	1" Coupling
12NPxx[4]	1/2" Threaded Nipple
34NPxx[4]	3/4" Threaded Nipple
1NPxx[4]	1" Threaded Nipple
HHxx[4,6]	Extra Handhole

	Architectural Colors (powder finish)[7]
	Standard Colors
DDB	Dark bronze
DWH	White
DBL	Black
	Classic Colors
DMB	Medium bronze
DNA	Natural aluminum
DSS	Sandstone
DGC	Charcoal gray
DTG	Tennis green
DBR	Bright red
DSB	Steel blue
GALV	Galvanized finish

HANDHOLE ORIENTATION



Handhole

NOTES:

1 When ordering tenon mounting and drill mounting for the same pole, follow this example: DM28/T20. The combination requires an extra handhole.

2 3-1/2" and 4" tenons available on 5" and 6" shafts only.

3 The drilling template to be used for a particular luminaire depends on the luminaire that is used. Refer to the Technical Data Section of the Outdoor Binder for Drilling Templates.

4 Specify location and orientation when ordering option.
For 1st "x": Specify the height in feet above base of pole.
Example: 5ft = 5 and 20ft = 20
For 2nd "x": Specify orientation from handhole (A,B,C,D)
Refer to the Handhole Orientation diagram on this page.

5 Horizontal arm is 18" x 2-3/8" O.D. tenon standard.

6 Combination of tenon-top and drill mount requires extra handhole.

7 Additional colors available; see Architectural Colors brochure, form no. 794.3.

IMPORTANT INSTALLATION NOTES:

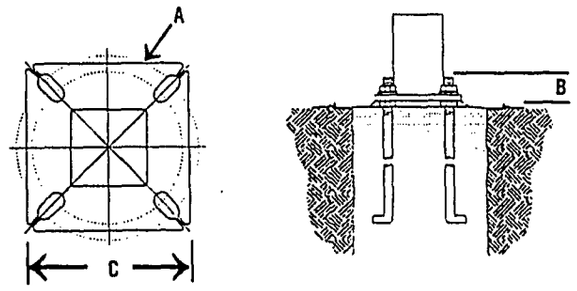
- Do not erect poles without having fixtures installed.
- Factory-supplied templates must be used when setting anchor bolts. Lithonia will not accept claim for incorrect anchorage placement due to failure to use factory template.
- If poles are stored outside, all protective wrapping must be removed immediately to prevent finish damage.
- Lithonia is not responsible for the foundation design.
- Installation requires grout to be packed under base to ensure full contact with foundation.

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

SSS Square Straight Steel Poles

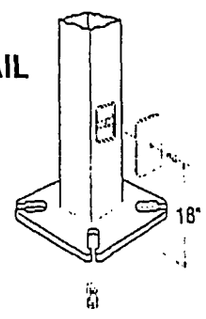
TECHNICAL INFORMATION

Catalog Number	Nominal shaft length (feet)	Pole Shaft Size(in x in x ft)	Wall Thickness (inches)	Gauge	EPA (ft²) with 1.3 gust 80 mph	Max. weight	90 mph	Max. weight	100 mph	Max. weight	Bolt Circle (inches)	Bolt Size (in. x in. x in.)	Approximate ship weight (pounds)
SSS 10 4C	10	4.0 x 10.0	0.125	11	30.6	765	23.8	595	18.9	473	8--9	3/4 x 18 x 3	75
SSS 12 4C	12	4.0 x 12.0	0.125	11	24.4	610	18.8	470	14.8	370	8--9	3/4 x 18 x 3	90
SSS 14 4C	14	4.0 x 14.0	0.125	11	19.9	498	15.1	378	11.7	293	8--9	3/4 x 18 x 3	100
SSS 16 4C	16	4.0 x 16.0	0.125	11	15.9	398	11.8	295	8.9	223	8--9	3/4 x 18 x 3	115
SSS 18 4C	18	4.0 x 18.0	0.125	11	12.6	315	9.2	230	6.7	168	8--9	3/4 x 18 x 3	125
SSS 20 4C	20	4.0 x 20.0	0.125	11	9.6	240	6.7	167	4.5	150	8--9	3/4 x 18 x 3	140
SSS 20 4G	20	4.0 x 20.0	0.188	7	16.5	415	12.25	310	9.3	240	8--9	3/4 x 30 x 3	198
SSS 20 5C	20	5.0 x 20.0	0.125	11	17.7	443	12.7	343	9.4	235	10--12	1 x 36 x 4	185
SSS 20 5G	20	5.0 x 20.0	0.188	7	28.1	703	21.4	535	16.2	405	10--12	1 x 36 x 4	265
SSS 25 4C	25	4.0 x 25.0	0.125	11	4.8	150	2.6	100	1.0	50	8--9	3/4 x 18 x 3	170
SSS 25 4G	25	4.0 x 25.0	0.188	7	10.8	270	7.7	188	5.4	135	8--9	3/4 x 30 x 3	245
SSS 25 5C	25	5.0 x 25.0	0.125	11	9.8	245	6.3	157	3.7	150	10--12	1 x 36 x 4	225
SSS 25 5G	25	5.0 x 25.0	0.188	7	18.0	350	12.6	350	9.0	250	10--12	1 x 36 x 4	320
SSS 30 4G	30	4.0 x 30.0	0.188	7	6.4	160	4.0	100	2.3	58	8--9	3/4 x 30 x 3	295
SSS 30 5C	30	5.0 x 30.0	0.125	11	4.7	150	2.0	50	--	--	10--12	1 x 36 x 4	265
SSS 30 5G	30	5.0 x 30.0	0.188	7	10.7	267	6.7	167	3.9	100	10--12	1 x 36 x 4	380
SSS 30 6G	30	6.0 x 30.0	0.188	7	15.7	392	10.2	257	6.4	160	11--13	1 x 36 x 4	520
SSS 35 5G	35	5.0 x 35.0	0.188	7	5.9	150	2.5	100	--	--	10--12	1 x 36 x 4	440
SSS 35 6G	35	6.0 x 35.0	0.188	7	9.5	237	5.0	150	1.8	50	11--13	1 x 36 x 4	540
SSS 39 6G	39	6.0 x 39.0	0.188	7	5.1	128	1.3	33	--	--	11--13	1 x 36 x 4	605



Shaft Base Size	Bolt Circle A	Bolt Projection B	Base Square C	Anchor Bolt Description	Warehouse Anchor Bolt Description	Template Number
4"C	8-1/2"	2-3/4"–4"	8"	ABSSS-4C	AB18-0	PJ50004
4"G	8-1/2"	2-3/4"–4"	8"	ABSSS-4G	AB30-0	PJ50004
5"	10"–12"	3-3/8"–4"	11"	ABSSS-5	AB36-0	PJ50010
6"	11"–13"	3-3/8"–4"	12-1/2"	ABSSS-6	AB36-0	PJ50011

BASE DETAIL



IMPORTANT:

- These specifications are intended for general purposes only. Lithonia reserves the right to change material or design, without prior notice, in a continuing effort to upgrade its products.

LITHONIA LIGHTING
An AcuityBrands Company

Sheet #: Pole-SSS ©1994 Lithonia Lighting, Rev. 6/02 Pole-SSS.P65

Lithonia Lighting
Acuity Lighting Group, Inc.
Outdoor Lighting
One Lithonia Way, Conyers, GA 30012
Phone: 770-922-9000 Fax: 770-918-1209
In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

5K

LITHONIA LIGHTING®

Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

INTENDED USE — Ideal for parking areas, street lighting, walkways and car lots.

CONSTRUCTION — Rugged, die-cast, soft corner aluminum housing with 0.12" nominal wall thickness. Extruded 4" soft corner arm for pole or wall mounting is standard. Die-cast door frame has impact-resistant, tempered, glass lens that is fully gasketed with one-piece tubular silicone.

FINISH — Standard finish is dark bronze (DDB) polyester powder finish, with other architectural colors available.

OPTICAL SYSTEM — Anodized, aluminum hydroformed reflectors: IES full cutoff distributions R2 (asymmetric), R3 (asymmetric), R4 (forward throw) and R5S (square). High-performance anodized, segmented aluminum reflectors IES full cutoff distributions SR2 (asymmetric), SR3 (asymmetric) and SR4SC (forward throw, sharp cutoff). Segmented reflectors attach with tool-less fasteners and are rotatable and interchangable.

ELECTRICAL SYSTEM — High reactance, high power factor ballast for 100W/150W. Constant-wattage autotransformer for 175-400W. Super CWA Pulse Start ballast required for 200W, 320W and 350W (must order SCWA option). Ballast is copper-wound and 100% factory-tested. Porcelain, horizontal, position-oriented, socket with copper alloy, nickel-plated screw shell and center contact. Medium-base socket used with 100W & 150W, mogul-base socket used with 175-400W. UL listed 1500W-600V.

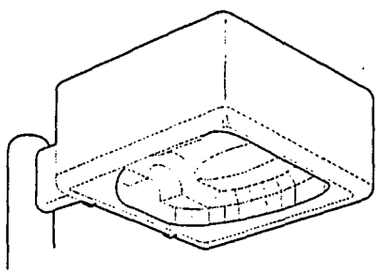
LISTING — UL Listed (standard). CSA Certified (see Options). UL listed for wet locations. IP65 rated in accordance with standard IEC 529.

Soft Square Cutoff Lighting

CONTOUR® SERIES

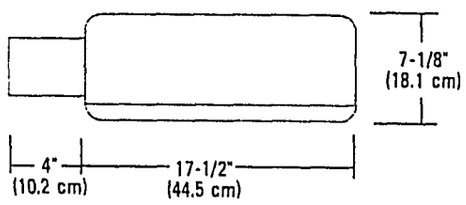
KAD

METAL HALIDE
100W, 150W, 175W, 200W,
250W, 320W, 350W, 400W
20' to 35' Mounting



Standard Dimensions

EPA: 1.2 ft.²
Weight: 41 lbs (18.6 kg)
Length: 17-1/2" (44.5 cm)
Width: 17-1/2" (44.5 cm)
Depth: 7-1/8" (18.1 cm)



ORDERING INFORMATION

Example: **KAD 400M R2 120 SPD04**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog number.

KAD 175M R3 277 SPD04 DDB

Series

KAD 100M
KAD 150M
KAD 175M
KAD 200M
KAD 250M
KAD 320M[1]
KAD 350M[1]
KAD 400M[1]

Distribution

Hydroformed Reflectors
R2 IES type II asymmetric[2]
R3 IES type III asymmetric[2]
R4 IES type IV forward throw[2]
R5 IES type V square

Segmented Reflectors
SR2 IES type II asymmetric[2]
SR3 IES type III asymmetric[2]
SR4SC IES type IV forward throw

Voltage

120
208[3]
240[3]
277
347
480[3]
TB[4]

Mounting

SPD04 Square pole (4" arm) (standard)
SPD09 Square pole (9" arm)[5]
RPD04 Round pole (4" arm)
RPD09 Round pole (9" arm)[5]
WWD04 Wood pole or wall (4" arm)
WWD09 Wood pole or wall (9" arm)[5,6]
WBD04 Wall bracket (4" arm)[6]
WBD09 Wall bracket (9" arm)[6]
L/Arm (When ordering KMA, DAD12)

Shipped Separately
KMA Mast arm adapter
KTMB Twin mounting bar
DAD12P Degree Arm (pole)
DAD12WB Degree Arm (wall)

Options

Shipped Installed In Fixture
SF Single fuse (120, 277, 347V, n/a TB)
DF Double fuse (208, 240, 480V, n/a TB)
PER NEMA twist-lock receptacle only (no photocontrol)
LPI Lamp included
PD Power Tray[10]
WTB Terminal Wiring Block[10]
QRS Quartz restrike system (250W maximum, lamp not included)[7]
CSA CSA Certified
SCWA Super CWA Pulse Start Ballast (n/a 100W & 175W)

Shipped Separately[5]
PE1 NEMA twist-lock PE (120, 208, 240V)
PE3 NEMA twist-lock PE (347V)
PE4 NEMA twist-lock PE (480V)
PE7 NEMA twist-lock PE (277V)
HS House-side shield (R2, R3, R4) (SR2, SR3)
KADVG Vandal guard
KADWG Wire guard

Architectural Colors[8]

Standard Colors
DDB Dark bronze (standard)
DWH White
DBL Black

Classic Colors
DMB Medium bronze
DNA Natural aluminum
DSS Sandstone
DGC Charcoal gray
DTG Tennis green
DBR Bright red
DSB Steel blue

NOTES:
1 Reduced jacket ED28 lamp must be used with SR2, SR3 & SR4SC optics.
2 House-side shield available.
3 Consut factory for availability in Canada.
4 Optional multi-tap ballast (120, 208, 240, 277V).
5 The SPD09, RPD09 or WWD09 must be used when two or more luminaires are oriented on a 90° drilling pattern.
6 May be ordered as accessory.
7 QRSTD available in select wattages; consult factory.
8 Additional architectural colors available; please see Architectural Colors brochure, form no. 794.3.
9 Must use RPD09.
10 Only available with SR2, SR3, and SR4SC optics.

Accessories: Tenon Mounting Slipfitter

Order as separate catalog number.

Tenon O.D.	Number of fixtures: One	Two@180°	Two@90°	Three@120°	Three@90°	Four@90°
2-3/8"	T20-190	T20-280	T20-290[9]	T20-320[9]	T20-390[9]	T20-490[9]
2-7/8"	T25-190	T25-280	T25-290[9]	T25-320	T25-390[9]	T25-490[9]
4"	T35-190	T35-280	T35-290[9]	T35-320	T35-390[9]	T35-490[9]

SK

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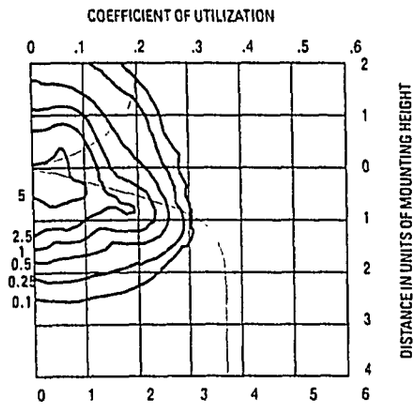
KAD 400M Arm-mounted Soft Square Cutoff

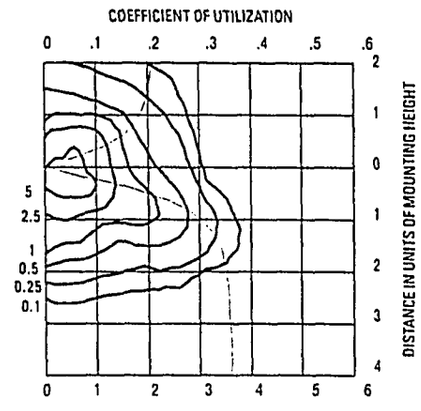
Coefficient of Utilization ———
Initial Footcandles ———

KAD R2 Test no. 1193083101



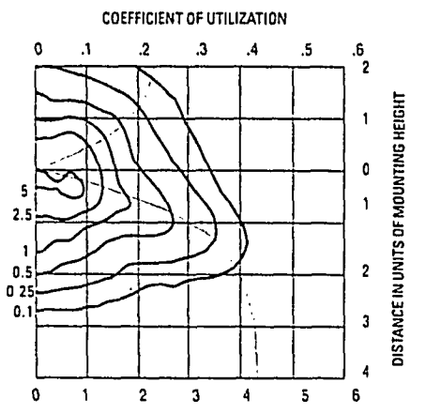
400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type II, cutoff.

KAD R3 Test no. 1192040902



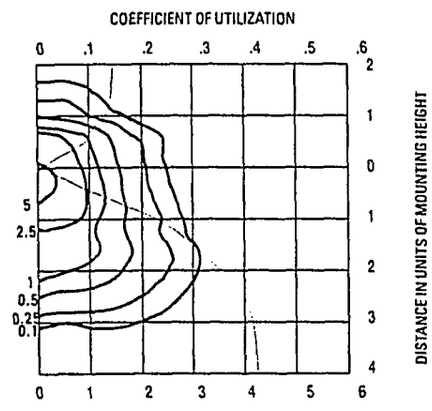
400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type III, cutoff.

KAD R3 RJ Test no. 1192041502



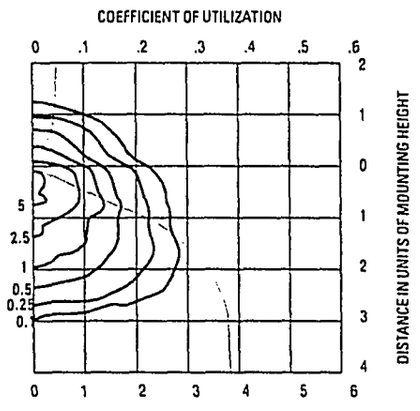
400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type III, cutoff.

KAD R4 Test no. 1191110101



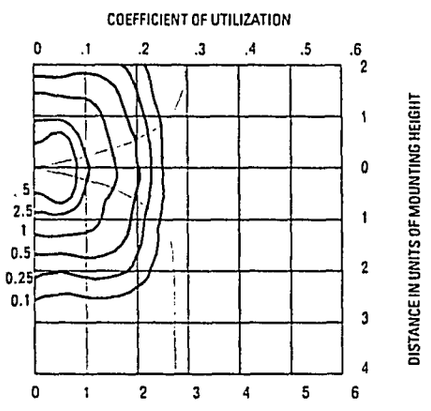
400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type IV, cutoff.

KAD R4HS Test no. 1192061101



400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type IV, cutoff.

KAD R5S Test no. 1193111901



400W Metal Halide lamp, 32,000 rated lumens, Footcandle values based on 30' mounting height, Distribution Type V, cutoff.

Electrical Characteristics

Wattage/ballast	Primary voltage	Line current (Amps) Start/Operating	Primary dropout voltage	Input watts	Power factor (%)	Regulation Line V = Lamp lumens
	120	2.50/4.00	55			
400CWA	208	1.45/2.30	95			
Peak-lead	240	1.25/2.00	110	455	90+	±10% = ±10%
Autotransformer	277	1.10/1.75	125			
	480	.73/1.00	225			

Tested to current IES and NEMA standards under stabilized laboratory conditions. Various operating factors can cause differences between laboratory data and actual field measurements. Dimensions and specifications on this sheet are based on the most current available data and are subject to change without notice.

Mounting Height Correction Factor
(Multiply the fc level by the correction factor)
25 ft. = 1.44
35 ft. = 0.73
40 ft. = .56

$$\left(\frac{\text{Existing Mounting Height}}{\text{New Mounting Height}}\right)^2 = \text{Correction Factor}$$

Notes:
1 Photometric data for other distributions can be accessed from the Lithonia Lighting website. (www.lithonia.com)

LITHONIA LIGHTING®
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One Lithonia Way, Conyers, GA 30012
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LITHONIA LIGHTING

Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

CONSTRUCTION

Weldable-grade, hot-rolled, commercial-quality carbon steel tubing with a minimum yield of 55,000 psi (11-gauge), 50,000 psi (7-gauge). Uniform wall thickness of .125" or .188". Shafts are one-piece with a longitudinal electric resistance weld. Uniformly square in cross-section with flat sides, small corner radii and excellent torsion. Available shaft widths are 4", 5" and 6".

Anchor base is fabricated from hot-rolled carbon steel plate that meets or exceeds a minimum yield strength of 36,000 psi. The anchor base is provided with slotted holes. Base cover is finished to match pole.

A handhole having nominal dimensions of 3" x 5" for all shafts. Included is a cover with attachment screws.

Top cap provided with all drill-mount poles.

Fasteners are high-strength galvanized zinc-plated or stainless steel.

FINISH — Dark bronze (DDB) polyester powder standard. Other architectural colors available.

GROUNDING — A nut holder located immediately inside the handhole rim is provided with a 1/2" – 13 UNC ground bolt and nut.

ANCHOR BOLTS — Top protion of anchor bolt is galvanized per ASTM A-153. Made of steel rod having a minimum yield strength of 55,000 psi.

Anchor Base Poles

SSS

SQUARE STRAIGHT STEEL

ORDERING INFORMATION

Example: **SSS 20 5C DM19 DDB**

Choose the boldface catalog nomenclature that best suits your needs and write it in the appropriate blank.

SSS	16	4C	DM19 DM29	DDB
Shaft type	Nominal shaft length	Nominal shaft base size/ wall thickness	Mounting[1]	Options
SSS	10 – 39 feet (See back page.)	(See back page.)		

Mounting[1]

	Tenon Mounting
PT	Open top
T20	2-3/8" O.D. (2" NPS)
T25	2-7/8" O.D. (2-1/2" NPS)
T30[2]	3-1/2" O.D. (3" NPS)
T35[2]	4" O.D. (3-1/2" NPS)
	Drill Mounting[3]
DM19	1 at 90°
DM28	2 at 180°
DM28PL	2 at 180° with one side plugged
DM29	2 at 90°
DM39	3 at 90°
DM49	4 at 90°
	Aeris Drill Mounting[3]
DM19AS	1 at 90°
DM28AS	2 at 180°
DM29AS	2 at 90°
DM39AS	3 at 90°
DM49AS	4 at 90°

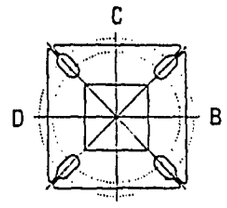
Options

Shipped Installed	
L/AB	Less Anchor Bolts
VD	Vibration Damper
TP	Tamper Proof
Hxx[4,5]	Horizontal Arm Bracket (1 fixture)
FDLxx[4]	Festoon Outlet less electrical
FGLxx[4]	Festoon GFI Outlet less electrical
12CPxx[4]	1/2" Coupling
34CPxx[4]	3/4" Coupling
1CPxx[4]	1" Coupling
12NPxx[4]	1/2" Threaded Nipple
34NPxx[4]	3/4" Threaded Nipple
1NPxx[4]	1" Threaded Nipple
HHxx[4,6]	Extra Handhole

Architectural Colors (powder finish)[7]

Standard Colors	
DDB	Dark bronze
DWH	White
DBL	Black
Classic Colors	
DMB	Medium bronze
DNA	Natural aluminum
DSS	Sandstone
DGC	Charcoal gray
DTG	Tennis green
DBR	Bright red
DSB	Steel blue
GALV	Galvanized finish

HANDHOLE ORIENTATION



Handhole

NOTES:

1 When ordering tenon mounting and drill mounting for the same pole, follow this example: DM28/T20. The combination requires an extra handhole.

2 3-1/2" and 4" tenons available on 5" and 6" shafts only.

3 The drilling template to be used for a particular luminaire depends on the luminaire that is used. Refer to the Technical Data Section of the Outdoor Binder for Drilling Templates.

4 Specify location and orientation when ordering option.
For 1st "x": Specify the height in feet above base of pole.
Example: 5ft = 5 and 20ft = 20
For 2nd "x": Specify orientation from handhole (A,B,C,D)
Refer to the Handhole Orientation diagram on this page.

5 Horizontal arm is 18" x 2-3/8" O.D. tenon standard.

6 Combination of tenon-top and drill mount requires extra handhole.

7 Additional colors available; see Architectural Colors brochure, form no. 794.3.

IMPORTANT INSTALLATION NOTES:

- Do not erect poles without having fixtures installed.
- Factory-supplied templates must be used when setting anchor bolts. Lithonia will not accept claim for incorrect anchorage placement due to failure to use factory template.
- If poles are stored outside, all protective wrapping must be removed immediately to prevent finish damage.
- Lithonia is not responsible for the foundation design.
- Installation requires grout to be packed under base to ensure full contact with foundation.

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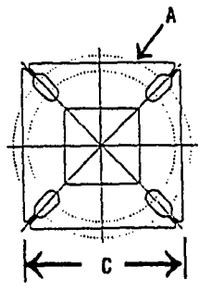
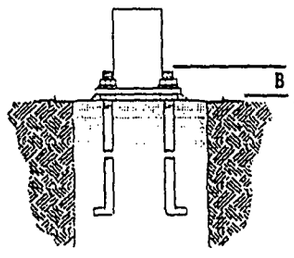
SSS Square Straight Steel Poles

TECHNICAL INFORMATION

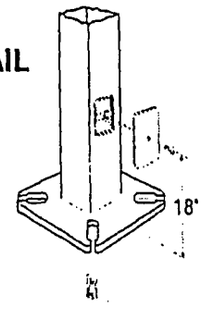
					EPA (ft^2) with 1.3 gust								
Catalog Number	Nominal shaft length (feet)	Pole Shaft Size(in x in x ft)	Wall Thickness (inches)	Gauge	80 mph	Max. weight	90 mph	Max. weight	100 mph	Max. weight	Bolt Circle (inches)	Bolt Size (in. x in. x in.)	Approximate ship weight (pounds)
SSS 10 4C	10	4.0 x 10.0	0.125	11	30.6	765	23.8	595	18.9	473	8--9	3/4 x 18 x 3	75
SSS 12 4C	12	4.0 x 12.0	0.125	11	24.4	610	18.8	470	14.8	370	8--9	3/4 x 18 x 3	90
SSS 14 4C	14	4.0 x 14.0	0.125	11	19.9	498	15.1	378	11.7	293	8--9	3/4 x 18 x 3	100
SSS 16 4C	16	4.0 x 16.0	0.125	11	15.9	398	11.8	295	8.9	223	8--9	3/4 x 18 x 3	115
SSS 18 4C	18	4.0 x 18.0	0.125	11	12.6	315	9.2	230	6.7	168	8--9	3/4 x 18 x 3	125
SSS 20 4C	20	4.0 x 20.0	0.125	11	9.6	240	6.7	167	4.5	150	8--9	3/4 x 18 x 3	140
SSS 20 4G	20	4.0 x 20.0	0.188	7	16.5	415	12.25	310	9.3	240	8--9	3/4 x 30 x 3	198
SSS 20 5C	20	5.0 x 20.0	0.125	11	17.7	443	12.7	343	9.4	235	10--12	1 x 36 x 4	185
SSS 20 5G	20	5.0 x 20.0	0.188	7	28.1	703	21.4	535	16.2	405	10--12	1 x 36 x 4	265
SSS 25 4C	25	4.0 x 25.0	0.125	11	4.8	150	2.6	100	1.0	50	8--9	3/4 x 18 x 3	170
SSS 25 4G	25	4.0 x 25.0	0.188	7	10.8	270	7.7	188	5.4	135	8--9	3/4 x 30 x 3	245
SSS 25 5C	25	5.0 x 25.0	0.125	11	9.8	245	6.3	157	3.7	150	10--12	1 x 36 x 4	225
SSS 25 5G	25	5.0 x 25.0	0.188	7	18.0	350	12.6	350	9.0	250	10--12	1 x 36 x 4	320
SSS 30 4G	30	4.0 x 30.0	0.188	7	6.4	160	4.0	100	2.3	58	8--9	3/4 x 30 x 3	295
SSS 30 5C	30	5.0 x 30.0	0.125	11	4.7	150	2.0	50	--	--	10--12	1 x 36 x 4	265
SSS 30 5G	30	5.0 x 30.0	0.188	7	10.7	267	6.7	167	3.9	100	10--12	1 x 36 x 4	380
SSS 30 6G	30	6.0 x 30.0	0.188	7	15.7	392	10.2	257	6.4	160	11--13	1 x 36 x 4	520
SSS 35 5G	35	5.0 x 35.0	0.188	7	5.9	150	2.5	100	--	--	10--12	1 x 36 x 4	440
SSS 35 6G	35	6.0 x 35.0	0.188	7	9.5	237	5.0	150	1.8	50	11--13	1 x 36 x 4	540
SSS 39 6G	39	6.0 x 39.0	0.188	7	5.1	128	1.3	33	--	--	11--13	1 x 36 x 4	605





Shaft Base Size	Bolt Circle A	Bolt Projection B	Base Square C	Anchor Bolt Description	Warehouse Anchor Bolt Description	Template Number
4"C	8-1/2"	2-3/4"–4"	8"	ABSSS-4C	AB18-0	PJ50004
4"G	8-1/2"	2-3/4"–4"	8"	ABSSS-4G	AB30-0	PJ50004
5"	10"–12"	3-3/8"–4"	11"	ABSSS-5	AB36-0	PJ50010
6"	11"–13"	3-3/8"–4"	12-1/2"	ABSSS-6	AB36-0	PJ50011

BASE DETAIL



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In-grade Lighting

9300
4518

Well Lights

SL

Features

9300 models represent state-of-the-art technology in well light construction. 4518 accepts popular 12V MR16 quartz halogen lamps.

Features Aim-Lock™ to allow maintenance and relamping without re-aiming.

Triple-sealed power modules keep water away from ballast components.

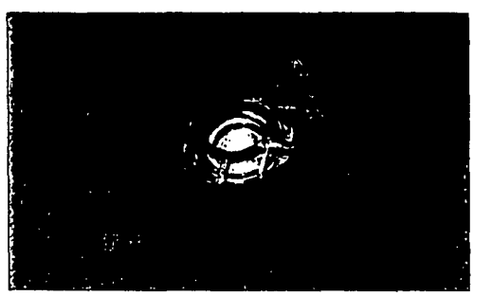
9300 available with internal or remote transformer. 4518 available with remote junction box or combination box (junction box, transformer housing, anti-wicking chamber).

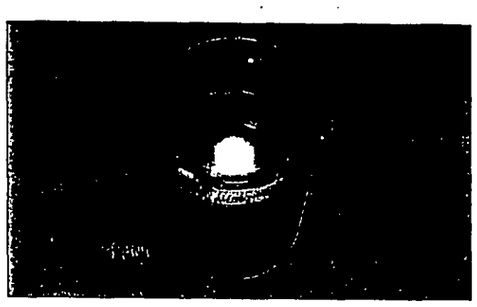
Listings – UL Listed. CSA Certified. NOM Certified.

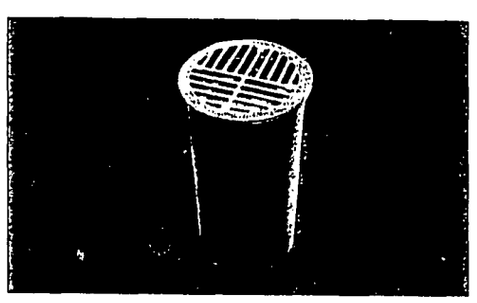
For product details and performance data, see the HYDREL binder or the on-line catalog at *www.hydrel.com.*

Intended Use

For flush-mounting in planters and open lawn areas. Provides a concealed light source for uplighting of trees, terraces or walls from a flat lawn.







Ordering Information

Example: **9300D A 100M 120 FL JBA01 AS TVG**

9350 D A 100M 120 SP JBA01 - AS TVG

Series
- 9300 Round
- 9305 Square
- 9350 Round
- 9355 Square
- 4518 Round

Lens[10]
- L Lexan[1]
- D Directional
- F Full eggcrate

Material
- A Aluminum
- B Bronze

Voltage
- 12[4], 120, 208, 220, 240, 277, 347

Note: Not all lamp/voltage combinations are available. Consult factory.

Conduit entries
- JBA01
- JBB01
- JBA16[8]
- JBB16[8]
- JBA16S[8]
- JBB16S[8]

Options
- AS Aim-Set ring
- LS Polycarbonate shield[9]

Internal honeycomb louvers
- IHL16 For MR16
- IHL36 For MR36
- IHL20 For PAR20
- IHL30 For PAR30
- IHL38 For PAR38

Lamp type for 9300

Incand.	Low voltage	H.I.D.
P2050 SP	M50 NFL	50S
P2050 NFL	M75 FL	70S
P2050 FL	P3636 WFL	100S
P3050 SP	P3650 WFL	50M
P3050 FL		70M
P3075 FL		100M
R2050		50H
		75H
		100H

Lamp type for 9350

Incand.	Quartz	H.I.D.
P38100 SP	100Q	50S
P38100 FL	150Q	70S
P38150 SP	250Q	100S
P38150 FL		150S
R40100 SP		50M
R40150 FL		70M
		100M
		175M
		50H
		75H
		100H
		175H
P3870M __[2]		
P38100M __[2]		
P38175M __[2]		
P38100H __[3]		

Lamp type for 4518

Low voltage
M50
M75

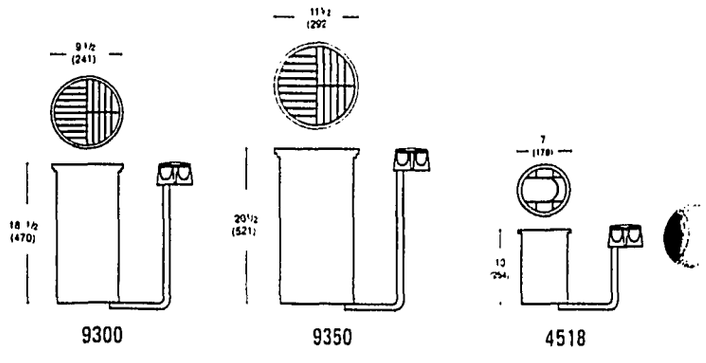
Distribution[5]
- FL Flood
- SP Spot

12V transformer[4]
- SCA03
- SCB03
- CBA30
- CBB30

Finish[6]
- TVG Terra verde green (standard)
- BL Black
- BZ Bronze
- GR Gray
- GN Green
- WH White

NOTES:
1. 75W max. in 9300, 100W max. in 9350.
2. Specify SP, FL or WFL as suffix.
3. Specify SP or FL as suffix.
4. 4518 only. Standard fixture does not include transformer. Must add SCA, SCB, CBA or CBB option.
5. Specify for H.I.D. and quartz lamps only.
6. Aluminum only.
7. N/A 9300 and 9305.
8. 9350 and 9355 only.
9. 4518 aluminum only, 50W maximum.
10. N/A 4518.

Dimensions are shown in inches (millimeters) unless otherwise noted.



9300 9350 4518

SL

LITHONIA LIGHTING

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

5M

LITHONIA LIGHTING

Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

INTENDED USE—Use for buillding and wall-mounted applications.

CONSTRUCTION—Extruded aluminum body with cast end caps is mounted with 1/4" bolts, to formed steel wall bracket. Housing body rotates to allow for variable aiming. Standard finish is dark bronze (DDB) polyester powder. Other architectural colors available.

Cast aluminum doorframe is hinged and secured by stainless steel fasteners. Closed cell silicone gasket prevents the penetration of dust and moisture.

OPTICAL SYSTEM—Centered optics with anodized, aluminum reflectors: segmented, specular or hammertone finish.

Clear, impact-resistant, tempered glass lens with silkscreen.

ELECTRICAL SYSTEM—150W and below utilizes a high reactance, high power factor ballast. 175W and above utilizes a constant-wattage autotransformer ballast. Both ballasts are copper wound and 100% factory tested.

Horizontal, medium-base porcelain socket with copper alloy, nickel-plated screw shell and center contact. 4KV pulse rated. UL listed 660W, 600V.

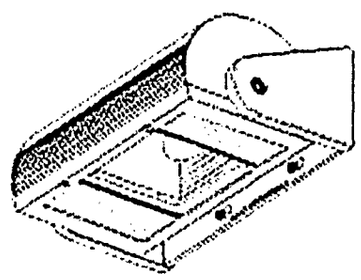
INSTALLATION—Mounting plate includes provision for attachment independent of junction box. Optional Backbox wall mounting available for surface conduit applications. Mounts either lens-up or lens-down.

LISTINGS—UL listed for wet locations. Listed and labeled to comply with Canadian Standards (see Options). IP65 rated in accordance with IEC standard 529.

Architectural Wall-Mounted Lighting

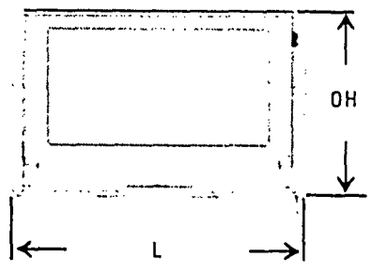
WFL2

METAL HALIDE
70, 100, 150, 175W



Standard dimensions - WFL2

EPA: 1.3 ft² (.12 m²)
Length: 18 -1/2 (47)
Depth: 6-3/4 (17.2)
Overall Height: 11-3/4 (29.9)
Max. Weight: 27 (12.2 kg)



All dimensions are inches (centimeters) unless otherwise specified.

ORDERING INFORMATION

Example: **WFL2 175M GZ 120 SF**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog numbers (shipped separately).

WFL2 | 175M | FT | 277 | DDB

Series
WFL2

Wattage/Source
70M
100M
150M[4]
175M

Distribution
SP Spot
BP Bi-Peak symmetric
HPN Narrow asymmetric
HPM Medium asymmetric
HPW Wide asymmetric
RN Narrow symmetric
RM Medium symmetric
RW Wide symmetric
GZ Wall grazing
FT Forward throw

Voltage
120
208[5]
240[5]
277
347
480
TB[1]

Options

Shipped Installed In Fixture
SF Single fuse (120, 277, 347V, n/a with TB)
DF Double fuse (208, 240, 480V, n/a with TB)
CR Corrosion-resistant finish
CSA Listed and labeled to comply with Canadian Standards
PE Photoelectric cell-button type (n/a with TB)
CFBL Color lens/Blue
CFRO Color lens/Rosa
SCWA Super CWA Pulse Start Ballast

Shipped Separately[2]
BBW Backbox wall mounting
UV Upper visor
EV Eggcrate visor (black)
FV Full visor
BV Bottom visor
WG Wire guard
BD Barn door
HLV Horizontal louver (black)
VLV Vertical louver (black)
BVG Bubble vandal guard

Architectural Colors
(powder finish)[3]

Standard Colors
DDB Dark bronze (standard)
DWH White
DBL Black

Classic Colors
DMB Medium bronze
DNA Natural aluminum
DSS Sandstone
DGC Charcoal gray
DTG Tennis green
DBR Bright red
DSB Steel blue

NOTES:
1 Optional multi-tap ballast (120, 208, 240, 277V). (120, 277, 347V in Canada).
2 May be ordered as an accessory. Door frame must be factory drilled.
3 Additional architectural colors available; see paint brochure (Form number 794.3).
4 May be ordered with SCWA.
5 Consult factory for availability in Canada.

5M

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

WFL2 Metal Halide Architectural Wall-Mounted Lighting

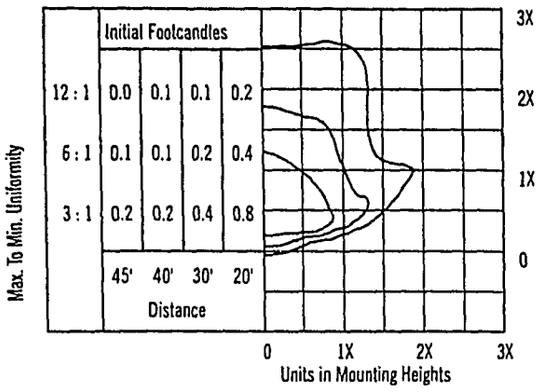
Luminaire/lamp	Iso-Illuminance Contour	Cartesian Plot	Max. to Min. Uniformity

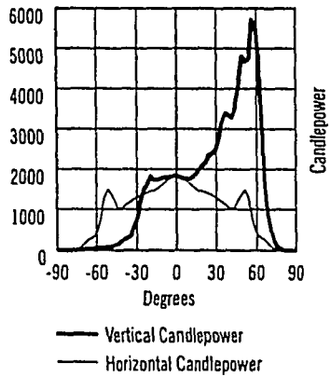
KFL2 175M FT
Test No.
LTL8556
12800 Lumens

10% Maximum
104° H x 103° V

50% Maximum
72° H x 40° V

Tilt = 45°





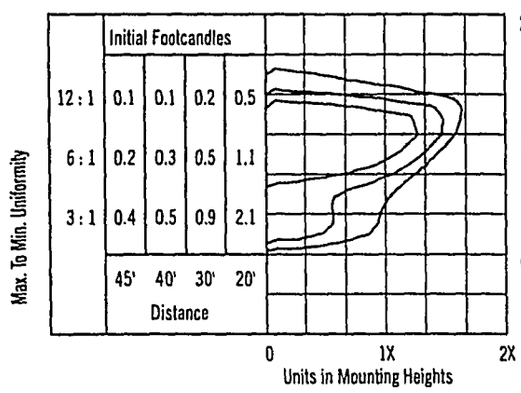
	D	Avg	Max	S	H	V
3 to 1	20	1.6	2.6	33	20	5
	30	0.7	1.2	49	29	8
	40	0.4	0.7	65	39	10
	45	0.3	0.5	73	44	11
6 to 1	20	2.2	4.6	9	33	2
	30	1.0	2.0	13	50	3
	40	0.5	1.1	17	66	4
	45	0.4	0.9	19	74	5

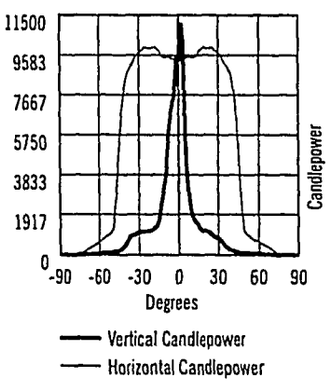
WFL2 175M GZ
Test No.
LTL8590
9500 Lumens

10% Maximum
101° H x 42° V

50% Maximum
89° H x 13° V

Tilt = 45°





	D	Avg	Max	S	H	V
3 to 1	20	8.0	11.1	18	12	13
	30	3.5	4.9	26	18	19
	40	2.0	2.8	35	24	25
	45	1.6	2.2	39	27	28
6 to 1	20	0.0	0.0	0	0	0
	30	0.0	0.0	0	0	0
	40	0.0	0.0	0	0	0
	45	0.0	0.0	0	0	0

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

LITHONIA LIGHTING
An AcuityBrands Company

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Lithonia Lighting
Acuity Lighting Group, Inc.
Outdoor Lighting
One Lithonia Way, Conyers, GA 30012-3957
Phone: 770-922-9000 Fax: 770-918-1209
In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

EXHIBIT

LITHONIA LIGHTING

Catalog Number	
Notes	Type 5P

FEATURES & SPECIFICATIONS

INTENDED USE—Use for buillding and wall-mounted applications.

CONSTRUCTION—Extruded aluminum body with cast end caps is mounted with 1/4" bolts, to formed steel wall bracket. Housing body rotates to allow for variable aiming. Standard finish is dark bronze (DDB) polyester powder. Other architectural colors available.

Cast aluminum doorframe is hinged and secured by stainless steel fasteners. Closed cell silicone gasket prevents the penetration of dust and moisture.

OPTICAL SYSTEM—Centered optics with anodized, aluminum reflectors: segmented, specular or hammertone finish.

Clear, impact-resistant, tempered glass lens with silkscreen.

ELECTRICAL SYSTEM—150W and below utilizes a high reactance, high power factor ballast. 175W and above utilizes a constant-wattage autotransformer ballast. Both ballasts are copper wound and 100% factory tested.

Horizontal, medium-base porcelain socket with copper alloy, nickel-plated screw shell and center contact. 4KV pulse rated. UL listed 660W, 600V.

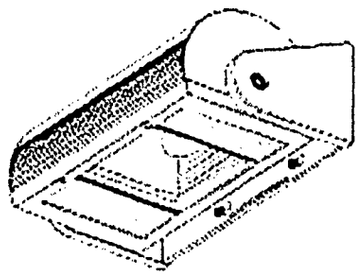
INSTALLATION—Mounting plate includes provision for attachment independent of junction box. Optional Backbox wall mounting available for surface conduit applications. Mounts either lens-up or lens-down.

LISTINGS—UL listed for wet locations. Listed and labeled to comply with Canadian Standards (see Options). IP65 rated in accordance with IEC standard 529.

Architectural Wall-Mounted Lighting

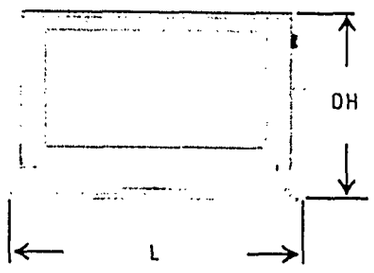
WFL2

METAL HALIDE
70, 100, 150, 175W



Standard dimensions - WFL2

EPA: 1.3 ft² (.12 m²)
Length: 18 -1/2 (47)
Depth: 6-3/4 (17.2)
Overall Height: 11-3/4 (29.9)
Max. Weight: 27 (12.2 kg)



All dimensions are inches (centimeters) unless otherwise specified.

ORDERING INFORMATION

Example: **WFL2 175M GZ 120 SF**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog numbers (shipped separately).

WFL2	100M	RM	277	DDB
Series	Wattage/Source	Distribution	Voltage	Options

Series
WFL2

Wattage/Source
70M
100M
150M[4]
175M

Distribution
SP Spot
BP Bi-Peak symmetric
HPN Narrow asymmetric
HPM Medium asymmetric
HPW Wide asymmetric
RN Narrow symmetric
RM Medium symmetric
RW Wide symmetric
GZ Wall grazing
FT Forward throw

Voltage
120
208[5]
240[5]
277
347
480
TB[1]

Options

Shipped Installed In Fixture
SF Single fuse (120, 277, 347V, n/a with TB)
DF Double fuse (208, 240, 480V, n/a with TB)
CR Corrosion-resistant finish
CSA Listed and labeled to comply with Canadian Standards
PE Photoelectric cell-button type (n/a with TB)
CFBL Color lens/Blue
CFRO Color lens/Rosa
SCWA Super CWA Pulse Start Ballast

Shipped Separately[2]
BBW Backbox wall mounting
UV Upper visor
EV Eggcrate visor (black)
FV Full visor
BV Bottom visor
WG Wire guard
BD Barn door
HLV Horizontal louver (black)
VLV Vertical louver (black)
BVG Bubble vandal guard

Architectural Colors
(powder finish)[3]

Standard Colors
DDB Dark bronze (standard)
DWH White
DBL Black

Classic Colors
DMB Medium bronze
DNA Natural aluminum
DSS Sandstone
DGC Charcoal gray
DTG Tennis green
DBR Bright red
DSB Steel blue

NOTES:
1 Optional multi-tap ballast (120, 208, 240, 277V). (120, 277, 347V in Canada).
2 May be ordered as an accessory. Door frame must be factory drilled.
3 Additional architectural colors available; see paint brochure (Form number 794.3).
4 May be ordered with SCWA.
5 Consult factory for availability in Canada.

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

WFL2 Metal Halide Architectural Wall-Mounted Lighting

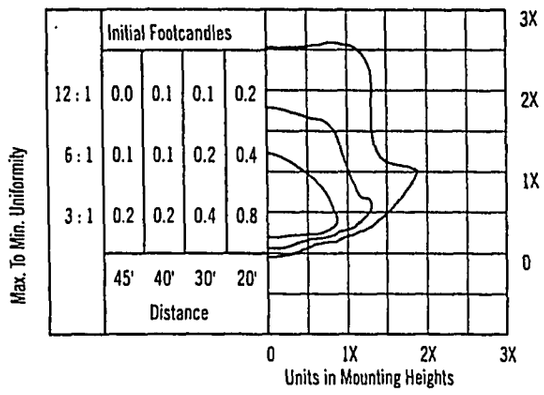
Luminaire/lamp	Iso-Illuminance Contour	Cartesian Plot	Max. to Min. Uniformity

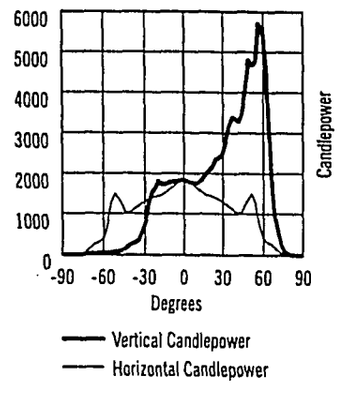
KFL2 175M FT
Test No.
LTL8556
12800 Lumens

10% Maximum
104° H x 103° V

50% Maximum
72° H x 40° V

Tilt = 45°





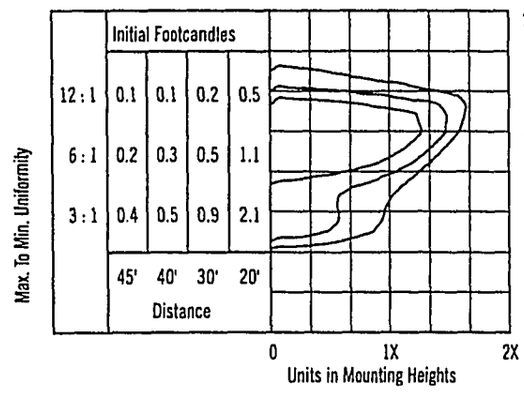
	D	Avg	Max	S	H	V
3 to 1	20	1.6	2.6	33	20	5
	30	0.7	1.2	49	29	8
	40	0.4	0.7	65	39	10
	45	0.3	0.5	73	44	11
6 to 1	20	2.2	4.6	9	33	2
	30	1.0	2.0	13	50	3
	40	0.5	1.1	17	66	4
	45	0.4	0.9	19	74	5

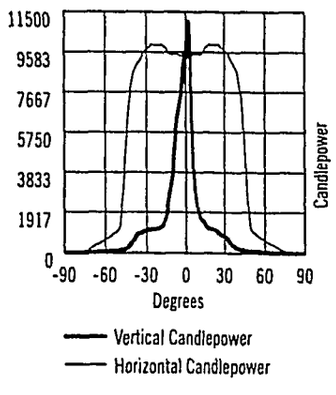
WFL2 175M GZ
Test No.
LTL8590
9500 Lumens

10% Maximum
101° H x 42° V

50% Maximum
89° H x 13° V

Tilt = 45°





	D	Avg	Max	S	H	V
3 to 1	20	8.0	11.1	18	12	13
	30	3.5	4.9	26	18	19
	40	2.0	2.8	35	24	25
	45	1.6	2.2	39	27	28
6 to 1	20	0.0	0.0	0	0	0
	30	0.0	0.0	0	0	0
	40	0.0	0.0	0	0	0
	45	0.0	0.0	0	0	0

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

SCANNED

LITHONIA LIGHTING
An AcuityBrands Company

Sheet #: WFL2-M

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WFL2-M.P65

Lithonia Lighting
Acuity Lighting Group, Inc.
Outdoor Lighting
One Lithonia Way, Conyers, GA 30012-3957
Phone: 770-922-9000 Fax: 770-918-1209
In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

LITHONIA LIGHTING

Catalog Number	
Notes	Type 5Q

FEATURES & SPECIFICATIONS

INTENDED USE—Use for buillding and wall-mounted applications.

CONSTRUCTION—Extruded aluminum body with cast end caps is mounted with 1/4" bolts, to formed steel wall bracket. Housing body rotates to allow for variable aiming. Standard finish is dark bronze (DDB) polyester powder. Other architectural colors available.

Cast aluminum doorframe is hinged and secured by stainless steel fasteners. Closed cell silicone gasket prevents the penetration of dust and moisture.

OPTICAL SYSTEM—Centered optics with anodized, aluminum reflectors: segmented, specular or hammertone finish.

Clear, impact-resistant, tempered glass lens with silkscreen.

ELECTRICAL SYSTEM—150W and below utilizes a high reactance, high power factor ballast. 175W and above utilizes a constant-wattage autotransformer ballast. Both ballasts are copper wound and 100% factory tested.

Horizontal, medium-base porcelain socket with copper alloy, nickel-plated screw shell and center contact. 4KV pulse rated. UL listed 660W, 600V.

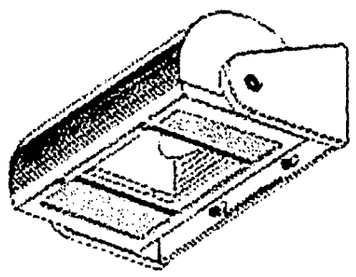
INSTALLATION—Mounting plate includes provision for attachment independent of junction box. Optional Backbox wall mounting available for surface conduit applications. Mounts either lens-up or lens-down.

LISTINGS—UL listed for wet locations. Listed and labeled to comply with Canadian Standards (see Options). IP65 rated in accordance with IEC standard 529.

Architectural Wall-Mounted Lighting

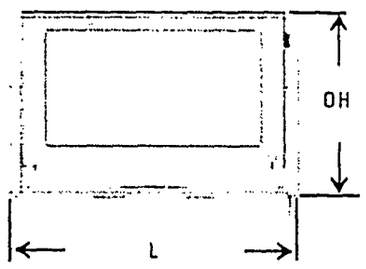
WFL2

METAL HALIDE
70, 100, 150, 175W



Standard dimensions - WFL2

EPA: 1.3 ft² (.12 m²)
Length: 18 -1/2 (47)
Depth: 6-3/4 (17.2)
Overall Height: 11-3/4 (29.9)
Max. Weight: 27 (12.2 kg)



All dimensions are inches (centimeters) unless otherwise specified.

ORDERING INFORMATION

Example: WFL2 175M GZ 120 SF

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog numbers (shipped separately).

WFL2 | 175M | FT | 277 | DDB

Series
WFL2

Wattage/Source
70M
100M
150M[4]
175M

Distribution
SP Spot
BP Bi-Peak symmetric
HPN Narrow asymmetric
HPM Medium asymmetric
HPW Wide asymmetric
RN Narrow symmetric
RM Medium symmetric
RW Wide symmetric
GZ Wall grazing
FT Forward throw

Voltage
120
208[5]
240[5]
277
347
480
TB[1]

Options

Shipped Installed In Fixture
SF Single fuse (120, 277, 347V, n/a with TB)
DF Double fuse (208, 240, 480V, n/a with TB)
CR Corrosion-resistant finish
CSA Listed and labeled to comply with Canadian Standards
PE Photoelectric cell-button type (n/a with TB)
CFBL Color lens/Blue
CFRO Color lens/Rosa
SCWA Super CWA Pulse Start Ballast

Shipped Separately[2]
BBW Backbox wall mounting
UV Upper visor
EV Eggcrate visor (black)
FV Full visor
BV Bottom visor
WG Wire guard
BD Barn door
HLV Horizontal louver (black)
VLV Vertical louver (black)
BVG Bubble vandal guard

Architectural Colors (powder finish)[3]
Standard Colors
DDB Dark bronze (standard)
DWH White
DBL Black
Classic Colors
DMB Medium bronze
DNA Natural aluminum
DSS Sandstone
DGC Charcoal gray
DTG Tennis green
DBR Bright red
DSB Steel blue

NOTES:
1 Optional multi-tap ballast (120, 208, 240, 277V). (120, 277, 347V in Canada).
2 May be ordered as an accessory. Door frame must be factory drilled.
3 Additional architectural colors available; see paint brochure (Form number 794.3).
4 May be ordered with SCWA.
5 Consult factory for availability in Canada.

5Q

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

WFL2 Metal Halide Architectural Wall-Mounted Lighting

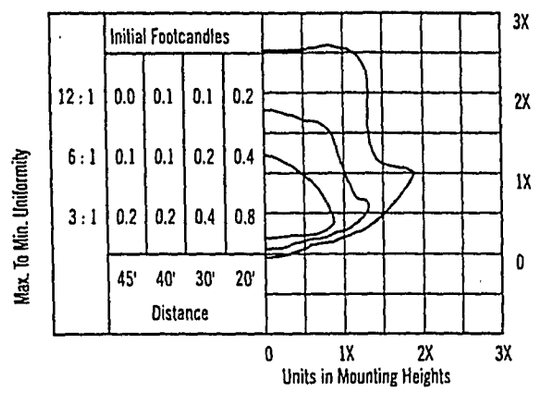
Luminaire/lamp	Iso-Illuminance Contour	Cartesian Plot	Max. to Min. Uniformity

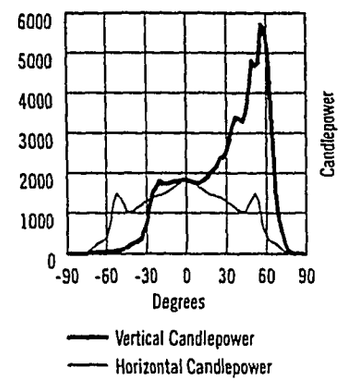
KFL2 175M FT
Test No.
LTL8556
12800 Lumens

10% Maximum
104° H x 103° V

50% Maximum
72° H x 40° V

Tilt = 45°





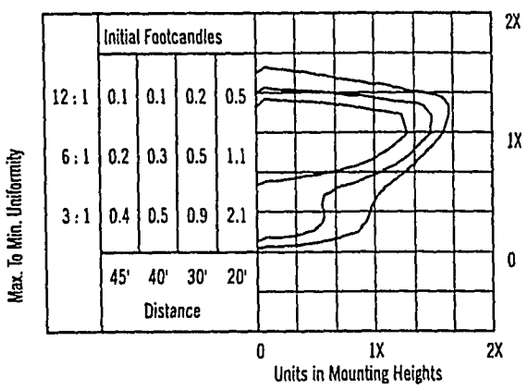
	D	Avg	Max	S	H	V
3 to 1	20	1.6	2.6	33	20	5
	30	0.7	1.2	49	29	8
	40	0.4	0.7	65	39	10
	45	0.3	0.5	73	44	11
6 to 1	20	2.2	4.6	9	33	2
	30	1.0	2.0	13	50	3
	40	0.5	1.1	17	66	4
	45	0.4	0.9	19	74	5

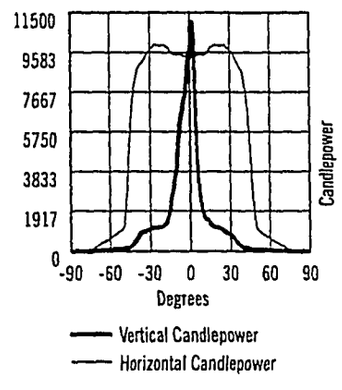
WFL2 175M GZ
Test No.
LTL8590
9500 Lumens

10% Maximum
101° H x 42° V

50% Maximum
89° H x 13° V

Tilt = 45°





	D	Avg	Max	S	H	V
3 to 1	20	8.0	11.1	18	12	13
	30	3.5	4.9	26	18	19
	40	2.0	2.8	35	24	25
	45	1.6	2.2	39	27	28
6 to 1	20	0.0	0.0	0	0	0
	30	0.0	0.0	0	0	0
	40	0.0	0.0	0	0	0
	45	0.0	0.0	0	0	0

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LITHONIA LIGHTING
An AcuityBrands Company

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Lithonia Lighting
Acuity Lighting Group, Inc.
Outdoor Lighting
One Lithonia Way, Conyers, GA 30012-3957
Phone: 770-922-9000 Fax: 770-918-1209
In Canada: 1100 50tn Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

DRAFT

55

LITHONIA LIGHTING

Catalog Number	
Notes	Type

FEATURES & SPECIFICATIONS

INTENDED USE — For entrances, stairwells, corridors and other pedestrian areas.

CONSTRUCTION — Rear housing is rugged, corrosion-resistant, die-cast aluminum. Front cover is one-piece UV-resistant injection molded polycarbonate, internally painted. Captive external hardware is specially treated for corrosion resistance and includes slotted hex-head and tamperproof fasteners.

OPTICAL SYSTEM — One-piece die-formed reflector is diffused aluminum. Refractor is clear polycarbonate, providing **IES cutoff** distribution and maximum lateral light output. Front cover is sealed and gasketed to inhibit the entrance of outside contaminants.

ELECTRICAL SYSTEM — Ballast is high reactance, high power factor, copper wound and 100% factory tested. UL listed. Components are heat-sinked directly to the cast housing for maximum heat dissipation (For 50 hertz availability, consult factory.)

Porcelain, horizontally oriented medium-base socket with copper alloy, nickel-plated screw shell and center contact. UL listed 660W, 600V and 4kV pulse rated.

Medium-base lamp included with fixture.

INSTALLATION — Mount to any vertical surface or to a 4" round square outlet box. Back access through gasketed slot. Top wiring access through 1/2" threaded conduit entry. (Through-wiring requires us of a conduit tee). Photocells are field-installable.

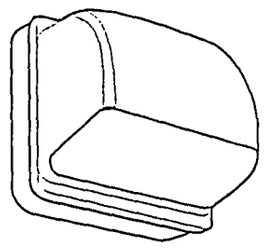
LISTING — UL listed for wet locations. IP65 listed. Listed and labeled to comply with Canadian and Mexican Standards (see options).

Cutoff Mini-WallPaks

TWAC

METAL HALIDE

50W, 70W, 100W



Height: 10" (25.4cm)
Width: 11-1/2" (29.2cm)
Depth: 8-15/16" (22.7cm)
Weight: 10 lbs. (4.53kg)

International Dark Sky Member

ORDERING INFORMATION

Example: **TWAC 50M 120 LPI**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog numbers (shipped separately).

TWAC _____ 100M _____ 277 _____ DMB _____ LPI

Series
TWAC

Wattage/lamp
50M
70M
100M

Voltage
120
208[6]
240[6]
277
347
TB[1]

Options

Shipped installed in fixture
- **SF** Single fuse (120, 277, 347V)[2]
- **DF** Double fuse (208, 240V)[2]
- **XHP** High power factor ballast
- **EC** Emergency circuit[3,4]
- **QRS** Quartz restrike system[3,4]
- **CR** Corrosion-resistant finish (rear housing only)
- **CRT** Corrosion-resistant teflon finish (rear housing)[5]
- **CSA** Listed and labeled to comply with Canadian Standards
- **NOM** Listed and labeled to comply with Mexican Standards (Consult factory)
- **PE** Photocell
- **L/LP** Less lamp

Architectural Colors (optional)
- **DNA** Natural aluminum
- **DBL** Black
- **DMB** Medium bronze
- **DWH** White

Lamp
- **LPI** Lamp included as standard

NOTES:
1. Optional multi-tap ballast (120/208/240/277V;120/277; 347V for Canada).
2. Not available with multi-tap ballast.
3. Lamp not included.
4. Quartz lamp wattage not to exceed ballast wattage rating.
5. Black finish on housing only.
6. Consult factory for availability in Canada.

Accessories

Order as separate catalog number

RK1 PEB1	Photocell kit (120V only)
RK1 PEB1 CSA	Photocell kit (120V only)
RK1 PEB2	Photocell kit (208, 240 or 277V)
RK1 PEB3 CSA	Photocell kit (347V)
TWAWG	Wireguard

55

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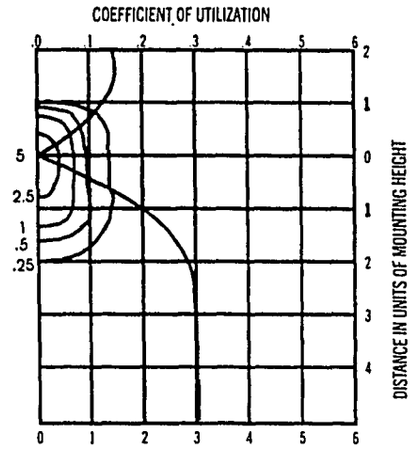
TWAC Metal Halide Wall-Pak

TWAC 50M

Test No. LTL8360

COEFFICIENT OF UTILIZATION

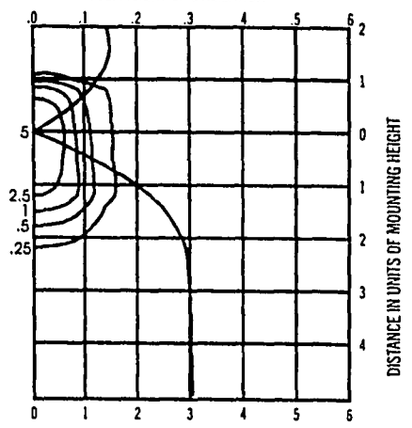


50W Metal Halide lamp, 8500 rated lumens. Footcandle values based on 20' mounting height, Distribution , cutoff.

TWAC 70M

Test No. LTL8338

COEFFICIENT OF UTILIZATION

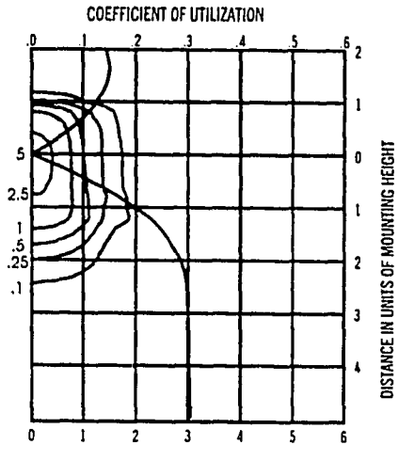


70W Metal Halide lamp, 5200 rated lumens. Footcandle values based on 20' mounting height, Distribution , cutoff.

TWAC 100M

Test No. LTL8359

COEFFICIENT OF UTILIZATION



100W Metal Halide lamp, 8500 rated lumens. Footcandle values based on 20' mounting height, Distribution , cutoff.

Mounting Height Correction Factor

(Multiply the fc level by the correction factor)

6'	8'	10'
8 ft. = 6.25	–	8 ft. = 6.25
10 ft.= 4.00	10 ft.= 4.00	–
12 ft.= 2.78	12 ft.= 2.78	12 ft.= 2.78

LITHONIA LIGHTING

An AcuityBrands Company

Lithonia Lighting
Acuity Lighting Group, Inc.
Outdoor Lighting
One Lithonia Way, Conyers, GA 30012-3957
Phone: 770-922-9000 Fax: 770-918-1209
In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

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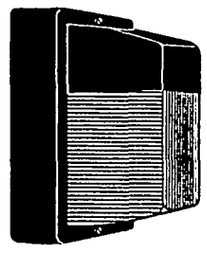
W

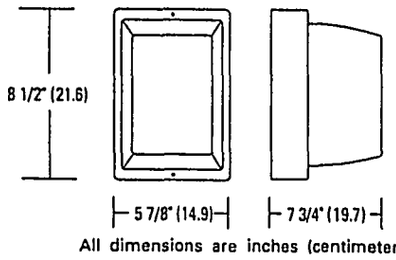
Catalog Number	
Notes	Type

Rough Service Fixture

VR2BV

COMPACT FLUORESCENT
Wall Mounted





All dimensions are inches (centimeters)

FEATURES

LENS — Clear prismatic, UV-stabilized, injection molded polycarbonate lens, nominal thickness 0.125 inch (1/8"). Smooth exterior for easy maintenance, accented with high strength POLANE® polyurethane coating for hardness, adhesion and abrasion resistance. Lens is secured by #8-32 stainless steel screws, either tamper-resistant Torx® T-20 or slotted hex-head screws (two of each included).

HOUSING — Constructed from one-piece, cast aluminum, finished in black polyester powder coat. One 1/2" opening allows rear conduit entry, or covers the outlet box. Two mounting holes are provided for wall mounting.

BALLAST — Electronic, High Power Factor with a starting temperature of 0°F (-18°C). Exception is 7TT Electromagnetic ballast, Normal Power Factor.

SOCKET — Thermoplastic socket(s).

LAMP — Lamp(s) included unless specified L/LP.

GASKETS — Perimeter housing gasket is one-piece, die-cut, closed-cell neoprene to seal out contaminants. Pad mounting gasket of closed-cell neoprene helps keep out moisture, insects and dust from housing.

LISTING — UL listed for wet locations. Listed and labeled to comply with Canadian and Mexican Standards (see options).

ORDERING INFORMATION

Example: **VR2BV 26TRT 120 GLR LPI**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog number.

VR2BV	32TRT	277		LPI
Series	**Wattage**	**Voltage**	**Options**	**Lamp[6]**
VR2BV	**7TT** One 7W twin-tube lamp[1]	**120**	**Shipped installed in fixture**	**LPI** Lamp(s) included (standard)
	2/7TT Two 7W twin-tube lamps[1]	**277**	**EC** Emergency circuit (Incandescent - 25W Max.)[3]	**L/LP** Less lamp(s)
	13DTT One 13W double twin-tube lamp[1]	**347**	**GLR** Internal fast-blow fusing	
	26TRT One 26W triple twin-tube lamp	**MVOLT[2]**	**GMF** Internal slow-blow fusing	
	32TRT One 32W triple twin-tube lamp		**NL** Night-light (Incandescent - 7W Max.)[3,4]	
			PE Photoelectric cell	
			SCB Surface conduit backbox[5]	
			CSA Listed and labeled to comply with Canadian Standards	
			NOM Listed and labeled to comply with Mexican Standards	

NOTES:
1 Not available in 347V.
2 Multi-volt electronic ballast (for DTT and TRT lamps) capable of operating on any line voltage between 120 and 277 volt.
3 Lamp by others.
4 Not available for 2/7TT.
5 Replaces standard backbox, UL listed for damp locations.
6 Lamp included unless specified L/LP.

Accessories

Order as separate catalog numbers.

RK1 T20BIT Hex-base driver bit, Torx TX20, for tamper-resistant screws with center reject pin.

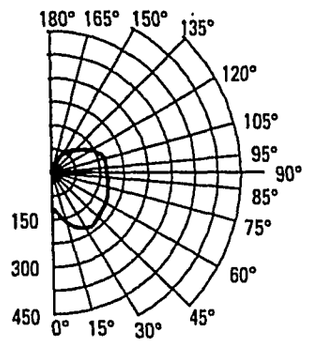
RK1 T20DRV Torx TX20 screwdriver for use with tamper-resistant screws with center reject pin.

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

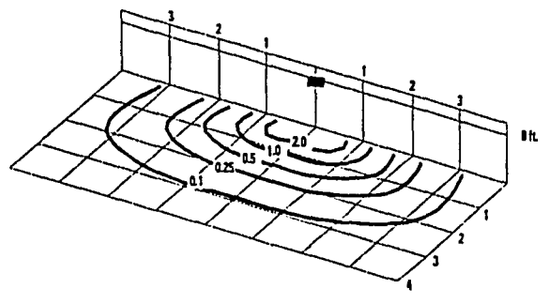
VR2BV Rough Service Wall-Mounted Fixture, Compact Fluorescent

VR2BV 32TRT, CF32DT/E/IN/835 lamp, 1.6 s/mh, 2400 rated lumens, test no. 99062201

Distribution data



Angle	cp.	Lumens
0°	114	0
5°	121	12
15°	145	41
25°	165	76
35°	178	112
45°	180	139
55°	171	153
65°	167	166
75°	161	170
85°	151	164
90°	146	0
95°	145	158
105°	140	148
115°	128	127
125°	115	103
135°	107	83
145°	92	58
155°	64	30
165°	31	9
175°	5	0
180°	0	0



Output data

Zone	Lumens	%lamp
0°- 30°	129	5.4
0°- 40°	241	10.0
0°- 60°	533	22.2
0°- 90°	1033	43.1
90°- 180°	715	29.8
0°- 180°	1749	*72.9

** Fixture efficiency*

Spacing criterion: 1.6
Spacing to mounting height: 1.6

Tested to current IES and NEMA standards under stabilized laboratory conditions. Various operating factors can cause differences between laboratory data and actual field measurements. Dimensions and specifications on this sheet are based on the most current available data and are subject to change without notice.

Mounting Height Correction Factor

To obtain the footcandle value for different mounting heights multiply the footcandle value by the above correction factor.

MH	6'	10'	12'	14'
8'	1.78	0.64	0.44	0.33

LITHONIA LIGHTING

Sheet#: VR2BV F

VR2BVF.P65

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Lithonia Lighting
Rough Service
One Lithonia Way, Conyers, GA 30012
Phone: 770-922-9000, 800-315-4963, Fax: 770-602-1531
In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

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X

LITHONIA LIGHTING®

Catalog Number	
Notes	Type

FEATURES

INTENDED USE

Ideal for applications requiring attractive, quick installation exit signs and low energy consumption.

CONSTRUCTION

Engineering-grade thermoplastic housing is impact-resistant, scratch-resistant and corrosion-proof. UL94V-0 flame rating (UL94-5VA with CSA option). UV-stable resin resists discoloration from natural and man-made light sources.

Rugged unibody housing snaps together with no additional mechanical fasteners. Faceplate and back cover are interchangeable on housing. Positive snap-fit tabs hold faceplate securely, yet pry out easily for lamp compartment access.

Universal directional chevron inserts are easily removed and reinserted. Uniform graphics illumination without shadows or hot spots. Reinforced, impact-resistant color panels. Letters 6" high with 3/4" stroke.

U.S. Patent No. 5,526,251, 5,611,163 and 5,954,423. Other patents pending.

LAMPS

LEDs mounted on printed circuit boards. Expected LED life over 25 years. Low energy consumption – less than one watt.

INSTALLATION

Universal (top, end or back) mounting. Easily removed mounting knockouts. J-box pattern on back panel. Housing snaps to canopy with four positive-locking tabs. Cam-locking pin tightly secures housing to canopy.

LISTING

UL listed (standard). CSA Certified, C-860 and C22.2 No.9 or NOM Certified (see Options). Meets UL, NFPA 101 (current Life Safety Code), NEC and OSHA illumination standards, and State of Minnesota energy-efficient legislation requiring less than 20W consumption. Meets Energy Star standards.

WARRANTY

Three-year total customer satisfaction warranty. For details, see the Product Selection Guide.

Thermoplastic Exits

LQM

LED Lamps

QUANTUM®

energy

ORDERING INFORMATION

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog number.

Example: LQM S W 3 R 120/277 DC6

LQM	S	W	3	G	120/277	
Family	Face type	Housing color	Number of faces	Letter color	Input voltage[3]	Options
LQM LED	S Stencil A Aluminum appearance stencil[1] P Panel[1,2]	(blank) Black[1] W White	1 Single face[1] 3 Single face with extra faceplate and color panel	R Red G Green[1]	120/277 Dual voltage[1] 120/347 Dual voltage[4]	(blank) None FI Fire alarm flashing interface[1] X2 Primary and secondary AC inputs provided[1,5,6] DC6 6V DC lamps and sockets[1,5] DC12 12V DC lamps and sockets[1,5] DC24 24V DC lamps and sockets[1,5] DC48 48V DC lamps and sockets[1,5] LDC6 6V DC input for LED lamps[4] LDC12/48 12V – 48V DC input for LED lamps[4] SALIDA Salida signage[1,7,8] CSA CSA Certified NOM NOM Certified for Mexico[1] DL Listed for damp location[1]

Accessories

Order as separate item.

ELA W QS12	12" stem kit (white)[9]
ELA WGEX	Back-mount wireguard
ELA WGEXT	Top-mount wireguard
ELA WGEXE	End-mount wireguard
ELA QMDC6	6V DC emergency lamps[10]
ELA LDC6 120/347	6V DC input for LED lamps, dual voltage AC input
ELA LDC12/48 120/347	12V-48V DC input for LED lamps, dual voltage AC input
ELA QMDC6 CSA	6V DC emergency lamps[11]
ELA LQMSORTIE	SORTIE stencil face & sign panel

NOTES:

1 Not available with CSA option.
2 Special wording available in red or green. Consult factory.
3 Some special voltages available. Consult factory.
4 Only available with CSA option.
5 UL listed as emergency lighting equipment.
6 Not available with FI option.
7 Not available with Aluminum (A) face type.
8 Letters 6" high with 7/16" stroke.
9 For other lengths, replace 12 with appropriate stem length in inches. Example: ELA W QS24
10 For other voltages, replace DC6 with DC12.
11 For other voltages, replace DC6 with DC12 or DC24.

Y

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LQM LED, Quantum

SPECIFICATIONS

ELECTRICAL

Primary Circuit

Type[1]	Rated LED life[1]	Supply voltage	Input watts	Max. amps
Red LED	25+ years	120	.62	.05
		277	.69	.06
		347	.77	.05
Green LED	25+ years	120	.62	.05
		277	.74	.06

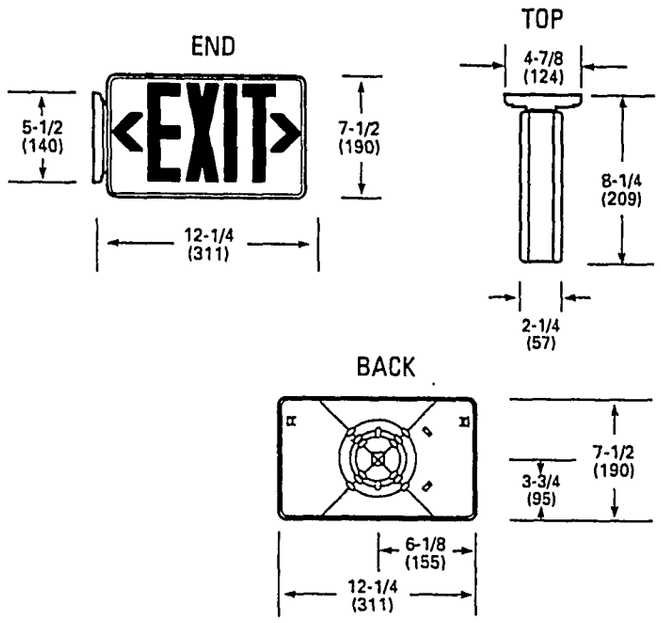
Supplemental Emergency Circuit

Type	Lamp description	Nominal lamp voltage	No. of faces	Electrical Input[2] watts	amps
DC6	Two #6S6/6V candelabra-base incandescent	6	1 or 2	12	2
DC12	Two #6S6/12V candelabra-base incandescent	12	1 or 2	12	1
DC24	6S6/24V candelabra-base incandescent	24	1 or 2	12	.5
DC48	6S6/48V candelabra-base incandescent	48	1 or 2	12	.25
DC6 CSA	One #908 wedge-base incandescent	6	1 or 2	9.0	1.5
DC12 CSA	One #915 wedge-base incandescent	12	1 or 2	9.0	.75
LDC6 CSA	LQM LED 6V DC input	6	1 or 2	0.96	.16
LDC12 CSA	LQM LED 12V DC input	12	1 or 2	1.20	.10
LDC24 CSA	LQM LED 24V DC input	24	1 or 2	1.24	.05
LDC32 CSA	LQM LED 32V DC input	32	1 or 2	1.28	.04
LDC48 CSA	LQM LED 48V DC input	48	1 or 2	1.36	.03

1 Based on continuous operation.
2 Electrical input shown is total for exit sign operating at indicated supply voltage.

MOUNTING

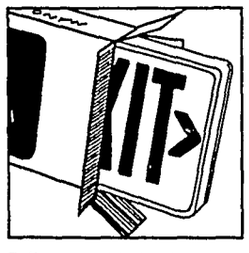
All dimensions are inches (millimeters).
Shipping weight: 2.6 lbs. (1.2 kgs.)



SPECIAL WORDING

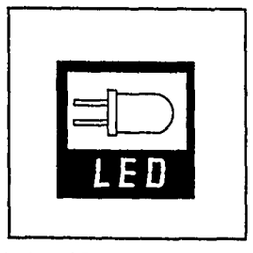
- Panel opening measures 7-5/8"x6-3/8" (see example above).
- Panel background color is black for black housing or white for white housing.
- If picture or foreign language required, send a reproduction of the image to Lithonia.
- Consult factory for additional ordering information.

KEY FEATURES



Fully assembled at factory.

Housing snaps to canopy for quick, easy installation.



Unique LEDs provide extremely long life and low energy consumption.

Listed and labeled to comply with Canadian Standard C-860 (CSA option).

LITHONIA LIGHTING®
An AcuityBrands Company

Sheet #: LQM ©1993 Acuity Lighting Group, Inc., Rev. 2/03 lqm.p65

Lithonia Lighting
Acuity Lighting Group, Inc.
Emergency Systems Group
One Lithonia Way, Decatur, GA 30035
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In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

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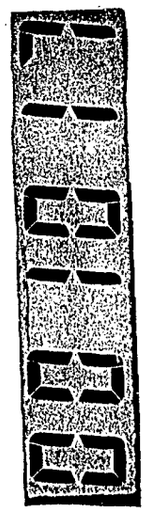


X1

LITHONIA LIGHTING®

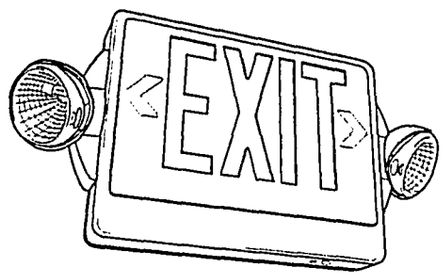
Catalog Number	
Notes	Type

Thermoplastic Exit/Unit Combo

QUANTUM®

LHQM

LED LAMPS



FEATURES

INTENDED USE

Suitable for applications requiring both exit sign and unit equipment. Attractive, 10-inch-tall, streamlined design is great for above-the-door applications and other tight fits.

CONSTRUCTION

Engineering-grade thermoplastic housing is impact-resistant, scratch-resistant and corrosion-proof. UL94V-0 flame rating. UV-stable white resin resists discoloration from natural and man-made light sources.

Rugged unibody housing snaps together with no additional fasteners. Faceplate and back cover are interchangeable on housing. Positive snap-fit tabs hold faceplate securely, yet pry out easily for lamp compartment access. Universal, directional chevron inserts are easily removed and reinserted.

Two 5.4W T-5 wedge-base krypton lamps with multi-faceted reflector and acrylic lenses provide superior optical control. Unique swivel-and-point arrangement permits full-range adjustment in lamp head direction.

Uniform graphics illumination without shadows or hot spots. Letters 6" high with 3/4" stroke.

Special wording available in red or green lettering. Consult factory.

U.S. Patent No. D379,373, 5,526,251, 5,611,163, 5,646,502. Canada Patent No. 80,141, 2,180,495.

LAMP

LED life exceeds 25 years, based on continuous operation. Low energy consumption — **only 3.3 watts.**

BATTERY

Sealed, maintenance-free lead-calcium battery delivers 90 minutes capacity to emergency lamps. Automatic recharge after 90-minute discharge. Test switch and LED provide visual and manual means of monitoring system operation. Slip-on battery terminals and polarized battery connector simplify installation and maintenance. Optional high-output battery (HO) to power a remote head or exit. See chart on back for details.

ELECTRONICS

Custom microchip charger, developed by Lithonia Emergency Systems, provides increased reliability and maximizes battery life. AC/LVD reset allows battery connection before AC power is applied and prevents battery damage from deep discharge.

Two-rate regulated charger minimizes energy consumption and provides low operating costs. Filtered charger output minimizes charge voltage ripple and extends battery life. Thermal protection senses circuitry temperature and adjusts charge current to prevent overheating and charger failure. Current-limiting charger circuitry protects printed circuit boards from shorts.

Brownout protection.

INSTALLATION

Top, end or back mounting. Housing snaps to canopy with four positive-locking tabs. Cam locking pin secures housing to canopy.

Easily removed mounting knockouts. Conduit entry knockout for 1/2" flexible conduit. J-box pattern on back panel.

LISTING

UL listed. Meets UL 924, NFPA 101 (current Life Safety Code), NEC and OSHA illumination standards.

WARRANTY

Five-year total customer satisfaction warranty. LED lamps are guaranteed for five years. See Product Selection Guide for details.

ORDERING INFORMATION

Example: **LHQM S W 1 R 120/277 FI**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog numbers.

LHQM	S	W	3	G	120/277	
Family	Face type	Housing color	Number of faces	Letter color	Input voltage	Options
LHQM LED exit/unit	**S** Stencil **P** Panel[1]	(blank) Black **W** White	**1** Single face **3** Single face with extra faceplate and color panel	**R** Red **G** Green	**120/277** Dual voltage	(blank) None **FI** Fire alarm flashing interface[2] **FA** Flashing emergency operation and intermittent audible alarm (66 times/min.; alarm 75 dB at 100cm) **H** Two 6W tungsten halogen lamps[3] **N** Maintenance-free nickel-cadmium battery **HO** High-output lead-calcium battery **RO** Less lamp heads

Accessories

Order as separate items.

ELA MR24 K0606	Compact MR24 remote head (6W, 6V)
ELA MR24 H0606	Compact MR24 remote head (6W, 6V halogen)
ELA NX HO606	NEMA 4X, sealed-beam remote fixture (6V,6W halogen)

NOTES:
1 Special wording available in red or green lettering. Consult factory.
2 Choice of FI or FA. Not available with both.
3 Not available with HO or N.

X1

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

LHQM LED Exit/Unit Combo, Quantum

SPECIFICATIONS

ELECTRICAL

Primary Circuit

	Rated LED life	Supply voltage	Max. amps	Max. watts
Red LED	25+ years	120	.23	3.3
		277	.23	3.3
Green LED	25+ years	120	.23	3.3
		277	.23	3.3

BATTERY

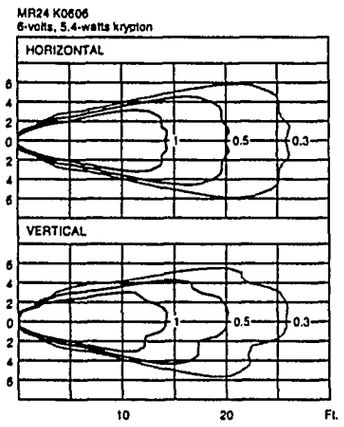
	Voltage	Shelf life[2]	Expected life[2]	Maintenance	Optimum temperature[4]
Lead-calcium	6	6 months	5–8 years	none[3]	60°–90°F
Ni-cad (N)	6	3 years	7–9 years	none[3]	32°–100°F

Notes:
1 Based on continuous operation.
2 At 77°F.
3 Periodic system status test recommended.
4 Optimum ambient temperature range where unit will provide capacity for 90 minutes. Higher and lower temperatures affect life and capacity. Consult factory for detailed information.

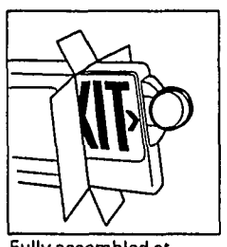
REMOTE OUTPUT CAPACITY

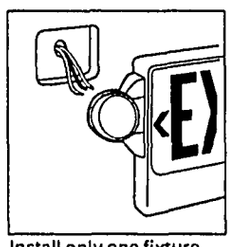
Standard combo	Combo\ ni-cad battery (N)	Combo\ halogen lamps (H)	Combo\ high-output battery (HO)	Combo\ no heads (RO)	Combo\no heads (RO) & high-output battery (HO)
NA	NA	NA	11.5W	10.8W	22.3W

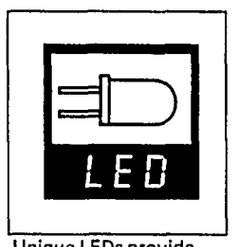
PHOTOMETRICS



KEY FEATURES


Fully assembled at factory.


Install only one fixture instead of two.

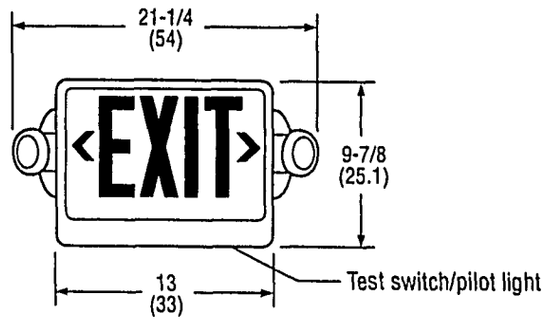


Unique LEDs provide extremely long life and low energy consumption.

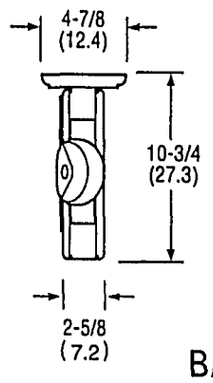
MOUNTING

All dimensions are inches (centimeters).
Shipping weight: 7.36 lbs. (3.3 kgs.).

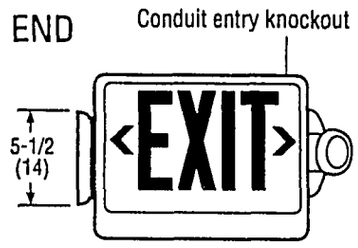
BACK



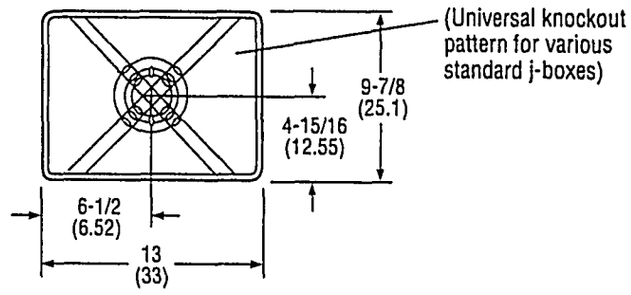
TOP



END



BACKPLATE



SPECIAL WORDING

- Panel opening measures 8" x 6-1/8" (see example above).
- Panel background color is black for black housing or white for white housing.
- If picture or foreign language required, send a reproduction of the image to Lithonia.
- Consult factory for additional ordering information.

LITHONIA LIGHTING®
An AcuityBrands Company

Sheet #: LHQM

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Lithonia Lighting
Acuity Lighting Group, Inc.
Emergency Lighting Systems
One Lithonia Way, Decatur, GA 30035
Phone: 800-334-8694
In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

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X2

LITHONIA LIGHTING

Catalog Number	
Notes	Type

Thermoplastic Exits

LQM EL N

LED Lamps
Emergency Operation
Nickel-Cadmium Battery

QUANTUM®

FEATURES

INTENDED USE

Ideal for applications requiring attractive, quick-installation exit signs and low energy consumption.

CONSTRUCTION

Engineering-grade thermoplastic housing is impact-resistant, scratch-resistant, and corrosion-proof. UL94V-0 flame rating (UL94-5VA with CSA option). UV-stable resin resists discoloration from natural and man-made light sources.

Rugged unibody housing snaps together with no additional mechanical fasteners. Faceplate and back cover are interchangeable on housing. Positive snap-fit tabs hold faceplate securely, yet pry out easily for lamp compartment access.

Universal directional chevron inserts are easily removed and reinserted. Uniform graphics illumination without shadows or hot spots. Reinforced, impact-resistant color panels. Letters 6" high with 3/4" stroke.

U.S. Patent No. 5,526,251, 5,611,163, 5,739,639 and 5,954,423. Canada Patent No. 2,204,218. Other patents pending.

LAMPS

LEDs mounted on printed circuit boards. Expected LED life over 25 years. Low energy consumption – less than one watt. LED lamp operates in normal (AC input) and emergency (DC input) modes.

BATTERY

Sealed, maintenance-free nickel-cadmium battery delivers 90-minute capacity to emergency lamps (30 minutes with CSA option). Automatic recharge after battery discharge.

Low-voltage disconnect prevents excessively deep discharge that can permanently damage battery. Recessed, conveniently located test switch and LED provide visual and manual means of monitoring system operation.

No battery connection required.

ELECTRONICS

Constant-current series charger minimizes energy consumption and provides low operating costs. Printed circuit boards are 100% quality tested during manufacturing. Current-limiting charger circuitry protects printed circuit boards from shorts.

DIAGNOSTICS (SD option only)

Two-state constant-current charger maximizes battery life and automatically recharges after battery discharge. Low voltage disconnect prevents excessive deep discharge that can permanently damage the battery. AC/LVD reset allows battery connection before AC power is applied and prevents battery damage from deep discharge.

Single-point microcomputer control for all electronic features.

Crystal oscillator timing system with watchdog protection for precision accuracy.

Brownout protection is automatically switched to emergency mode when supply voltage drops below 80% of nominal.

Single multi-chromatic LED indicator to display two-state charging, test activation and three-state diagnostic status.

Test switch provides manual activation of 30-second diagnostic testing for on-demand visual inspection. Self-diagnostic testing for five minutes every 30 days and 30 minutes every six months.

Diagnostic evaluation of LED light source, AC to DC transfer, charging and battery condition.

Continuously monitors AC functionality.

INSTALLATION

Universal (top-, end-, or back-) mounting. Easily removed mounting knockouts. J-box pattern on back panel. Housing snaps to canopy with four positive-locking tabs. Cam-locking pin tightly secures housing to canopy.

LISTING

UL listed (standard). CSA Certified or NOM Certified (see Options). Meets UL, NFPA 101 (current Life Safety Code), NEC and OSHA illumination standards, and State of Minnesota energy-efficient legislation requiring less than 20W consumption. Meets Energy Star standards.

WARRANTY

Five-year total customer satisfaction warranty, including the LED lamps. For details, see the Product Selection Guide.

ORDERING INFORMATION

Example: **LQM S W 3 R 120/277 EL N**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog number.

LQM	S	W	3	G	120/277	EL N	
Family	**Face type**	**Housing color**	**Number of faces**	**Letter color**	**Input voltage[3]**	**Emergency operation**	**Options**
LQM LED	S Stencil	(blank) Black[1]	1 Single face[1]	R Red	120/277 Dual voltage[1]	EL N Nickel-cadmium battery	(blank) None
	A Aluminum appearance stencil[1]	W White	3 Single face with extra faceplate and color panel	G Green[1]	120 120V[4]		F Flashing emergency operation (one flash/sec)[1,5,9]
	P Panel[1,2]				277 120V[1]		FI Fire alarm flashing interface[1,5]
					347 347V[4]		FA Flashing emergency operation and intermittent audible alarm (one flash/sec)[1,5]
							SALIDA Salida signage[1,6,7]
							CSA CSA Certified[10]
							NOM NOM Certified for Mexico[1]
							DL Damp location[1,9]
							SD Self-diagnostics[1,10]

NOTES:
1. Not available with CSA option.
2. Special wording available in red or green. Consult factory.
3. Some special voltages available. Consult factory.
4. Only available with CSA option and SD options.
5. Choice of F, FA or FI. Not available with more than one.
6. Not available with Aluminum (A) face type.
7. Letters 6" high with 7/16" stroke.
8. For other lengths, replace 12 with appropriate stem length in inches. Example: ELA W QS24
9. Not available with SD.
10. Must specify input voltage (120 or 277V).

Accessories

Order as separate item.

ELA W QS12	12" stem kit (white)[8]
ELA WGEX	Back-mount wireguard
ELA WGEXT	Top-mount wireguard
ELA WGEXE	End-mount wireguard
ELA LQMSORTIE	SORTIE stencil face and sign panel

X2

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

LQM EL N Emergency LED, Quantum

SPECIFICATIONS

ELECTRICAL

Primary Circuit

Type[1]	Rated LED life[2]	Supply voltage	Input watts	Max. amps
Red LED	25+ years	120	.71	.05
		277	.92	.06
		347	2.51	.01
Green LED	25+ years	120	.66	.05
		277	.70	.06

BATTERY

Nickel-Cadmium

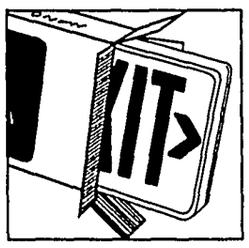
Voltage	Shelf life[3]	Expected life[3]	Maintenance	Optimum temperature[5]
1.2[6]	3 yrs.	7–9 yrs.	none[4]	32°–100°F (0°–37.8°C)

1 LED lamps operate in normal (AC input) and emergency (DC input) modes.
2 Based on continuous operation.
3 At 77°F (25°C).
4 Periodic system status test recommended.
5 Optimum ambient temperature range where unit will provide capacity for 90 minutes (30 minutes with CSA option). Higher and lower temperatures affect life and capacity. Consult factory for detailed information.
6 2.4 Volts for DL option.

SPECIAL WORDING

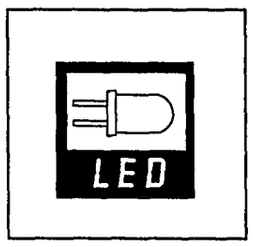
- Panel opening measures 7-5/8"x6-3/8" (see example above).
- Panel background color is black for black housing or white for white housing.
- If picture or foreign language required, send a reproduction of the image to Lithonia.
- Consult factory for additional ordering information.

KEY FEATURES



Fully assembled at factory.

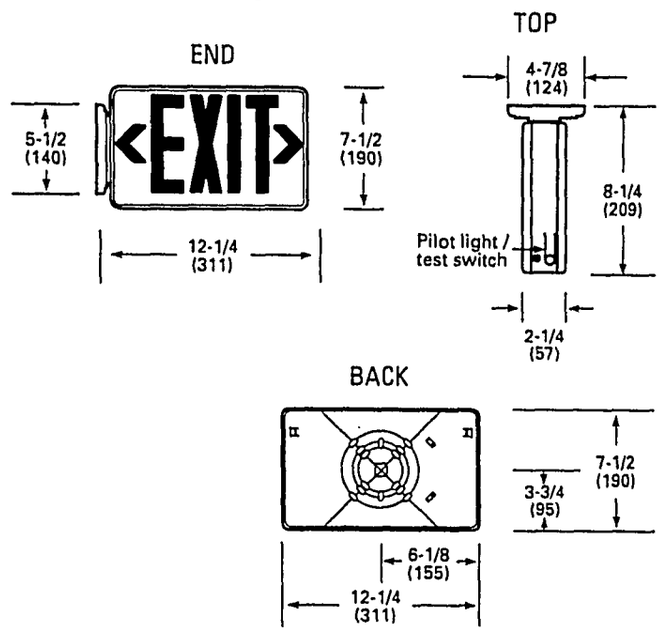
Housing snaps to canopy for quick, easy installation.



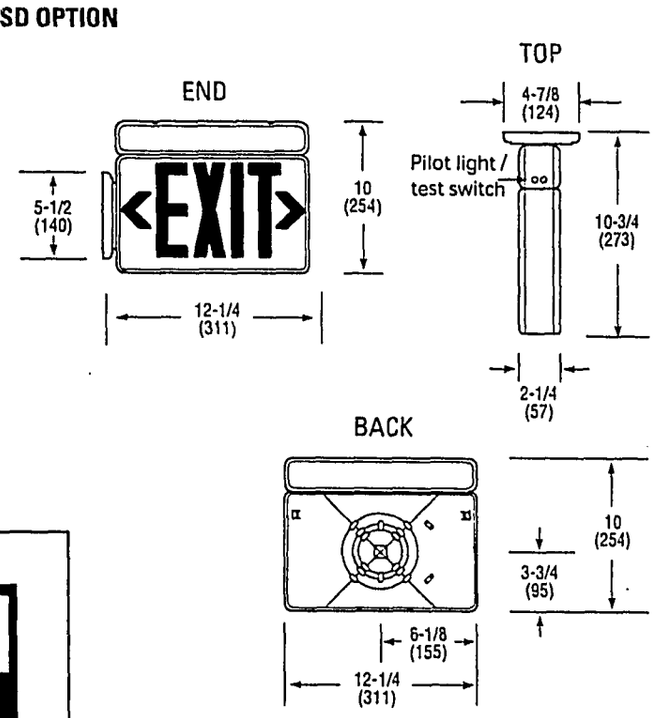
Unique LEDs provide extremely long life and low-energy consumption.

MOUNTING

All dimensions are inches (millimeters).
Shipping weight: 2.6 lbs. (1.2 kgs.)



SD OPTION



LITHONIA LIGHTING®
An AcuityBrands Company

Sheet #: LQM EL N

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Lithonia Lighting
Acuity Lighting Group, Inc.
Emergency Systems Group
One Lithonia Way, Decatur, GA 30035
Phone: 800-334-8694 Fax: 770-981-8141
In Canada: 1100 50th Ave., Lachine, Quebec H8T 2V3
www.lithonia.com

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D03-128

F

City of Tukwila

Department of Community Development

Steven M. Mullet, Mayor

Steve Lancaster, Director

December 20, 2004

Jim Harmon
Sabey Corporation
12201 Tukwila International Bl
4th Floor
Seattle, WA 98168

COPY

RE: Release of Performance Bond
Bond No. 52BSBCQ3977

Dear Mr. Harmon:

This letter hereby authorizes the release of the performance bond referenced above in the amount of $126,000.00 for the completion of the landscaping at the Department of Homeland Security building located at 12500 Tukwila International Bl, Tukwila, Washington.

If you should have any questions, please contact our office at (206)431-3672.

Sincerely,

Brenda Holt
Permit Coordinator

encl

xc: Permit No. D03-128

6300 Southcenter Boulevard, Suite #100 • Tukwila, Washington 98188 • Phone: 206-431-3670 • Fax: 206-431-3665

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

CLEAR

City of Tukwila

Steven M. Mullet, Mayor

Department of Community Development

Steve Lancaster, Director

December 20, 2004

Jim Harmon
Sabey Corporation
12201 Tukwila International Bl
4th Floor
Seattle, WA 98168

RE: Release of Performance Bond
Bond No. 52BSBCQ3975

Dear Mr. Harmon:

This letter hereby authorizes the release of the performance bond referenced above in the amount of $50,000.00 for the completion of the entry plaza at the Department of Homeland Security building located at 12500 Tukwila International Bl, Tukwila, Washington.

If you should have any questions, please contact our office at (206)431-3672.

Sincerely,

Brenda Holt
Permit Coordinator

encl

xc: Permit No. D03-128

6300 Southcenter Boulevard, Suite #100 • Tukwila, Washington 98188 • Phone: 206-431-3670 • Fax: 206-431-3665

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

City of Tukwila
6300 Southcenter Blvd, Suite 100
Tukwila, WA 98188
206-431-3670

RECEIVED
CITY OF TUKWILA
SEP 28 2004
PERMIT CENTER

DEVELOPER'S PROJECT WARRANTY REQUEST FORM

Section 1 – to be completed by Developer

Name of Development: U.S. Dept. of Homeland Security Date: 9/27/04

Address: 12500 Tukwila International Blvd., Tukwila, WA Permit No.: D03-128

Release should be sent to: Name: International Gateway East III LLC by Sabey Corporation ATTN: Jim Harmon, Manager

Address: 12201 Tukwila International Blvd., 4th Floor

City/State/Zip Seattle, WA 98168

Description of items to be completed (reference plans/documents where items are described):

Complete Entry Plaza at Building

As the owner, or authorized agent of the owner, I hereby submit cash or cash equivalent in the amount of $ 50,000.00 (150% of value to complete work above) and attach support documentation for value of work. I will have this work carried out and call for a final inspection by this date: 12/7/04, or risk having the City use these funds to carry out the work with their own contractor or in-house manpower. If I fail to carry out the work, I hereby authorize the City to go onto the property and carry out completion of the above deficiencies. I further agree to complete all work listed above prior to requesting inspection and release of these funds.

Signed: by Jim N. Harmon

Title: Secretary & Treasurer

Section 2 – to be completed by City staff — THIS FUND IS AUTHORIZED TO BE ACCEPTED

Signed: B MW Department Head:

Amount: $ 50,000 Deposited this Date: 9-28-04

☐ Cash/Check ☐ Cash Assignment ☒ Bond

City Receipt No.: Bond # 52BSBCQ3975 Received By: bholt

Section 3 – to be completed by Developer

All work identified in Section 1 of this form has now been completed and returned to department which authorized warranty. I hereby request inspection and release of my cash/cash equivalent/bond.

Developer's Representative: Date:

To be completed by City staff

I have reviewed the above work and found it acceptable and therefore authorize the release of the above cash/cash equivalent/bond.

Inspector: B MW Date: 12/20/04 Authorized By:

Section 4 – to be completed by City staff

Amount Released: $ 50,000

☐ Check - Check No. ☐ Cash Equivalent – Letter attached ☒ Bond – Letter attached

Date Released: 12-20-04 Released by: bholt

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PERFORMANCE BOND **Bond # 52BSBCQ3975**

KNOW ALL BY THESE PRESENTS, That we, **International Gateway East III LLC by Sabey Corporation**

(hereinafter called the Principal), as Principal, and **Hartford Fire Insurance Company**, a corporation duly organized under the laws of the State of **Connecticut** (hereinafter called the Surety), as Surety, are held and firmly bound unto **City of Tukwila Public Works Department**

, (hereinafter called the Obligee),

in the sum of **FIFTY THOUSAND AND NO/100THS**

(**$50,000.00**) Dollars, for the payment of which sum well and truly to be made, we, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Signed and sealed this **24th** day of **September**, **2004**.

WHEREAS, said Principal has entered into a written Contract with said Obligee, dated ,

for **Department of Homeland Security - Complete Entry Plaza**

in accordance with the terms and conditions of said Contract, which is hereby referred to and made a part hereof as if fully set forth herein:

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, That if the above bounden Principal shall well and truly keep, do and perform each and every, all and singular, the matters and things in said contract set forth and specified to be by said Principal kept, done and performed, at the times and in the manner in said contract specified, or shall pay over, make good and reimburse to the above named Obligee, all loss and damage which said Obligee may sustain by reason of failure or default on the part of said Principal so to do, then this obligation shall be null and void; otherwise shall remain in full force and effect.

NO SUIT, ACTION OR PROCEEDING by the Obligee to recover on this bond shall be sustained unless the same be commenced within two (2) years following the date on which Principal ceased work on said Contract.

International Gateway East III LLC by Sabey Corporation, manager

Principal

By _____
Treasurer & Secretary

Hartford Fire Insurance Company

By _____
Susan B. Larson Attorney-in-Fact

S-0757/GEEF 10/99

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POWER OF ATTORNEY

Direct Inquiries/Claims to:
THE HARTFORD
BOND, T-4
690 ASYLUM AVENUE
HARTFORD, CONNECTICUT 06115
call: **888-266-3488** *or fax:* **860-757-5835**
Agency Code: 52-815037

KNOW ALL PERSONS BY THESE PRESENTS THAT:

- [X] **Hartford Fire Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [X] **Hartford Casualty Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [X] **Hartford Accident and Indemnity Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Hartford Underwriters Insurance Company**, a corporation duly organized under the laws of the State of Connecticut
- [ ] **Twin City Fire Insurance Company**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of Illinois**, a corporation duly organized under the laws of the State of Illinois
- [ ] **Hartford Insurance Company of the Midwest**, a corporation duly organized under the laws of the State of Indiana
- [ ] **Hartford Insurance Company of the Southeast**, a corporation duly organized under the laws of the State of Florida

having their home office in Hartford, Connecticut, (hereinafter collectively referred to as the "Companies") do hereby make, constitute and appoint, ***up to the amount of unlimited:***

Charles A. Szopa, Shauna L. Henry, Barbara R. Johnson of Anchorage, AK;
Peter H. Hammett, Carl Newman, Tim Church, Pamela Nelson, Karen P. Dever, Deanna M. Meyer,
Jill Wallace, Stuart A. O'Farrell, Susan B. Larson of Bellevue, WA

their true and lawful Attorney(s)-in-Fact, each in their separate capacity if more than one is named above, to sign its name as surety(ies) only as delineated above by ☒, and to execute, seal and acknowledge any and all bonds, undertakings, contracts and other written instruments in the nature thereof, on behalf of the Companies in their business of guaranteeing the fidelity of persons, guaranteeing the performance of contracts and executing or guaranteeing bonds and undertakings required or permitted in any actions or proceedings allowed by law.

In Witness Whereof, and as authorized by a Resolution of the Board of Directors of the Companies on September 12th, 2000, the Companies have caused these presents to be signed by its Assistant Vice President and its corporate seals to be hereto affixed, duly attested by its Assistant Secretary. Further, pursuant to Resolution of the Board of Directors of the Companies, the Companies hereby unambiguously affirm that they are and will be bound by any mechanically applied signatures applied to this Power of Attorney.

Paul A. Bergenholtz, Assistant Secretary

Colleen Mastroianni, Assistant Vice President

STATE OF CONNECTICUT }
COUNTY OF HARTFORD } ss. Hartford

On this 25th day of October, 2002, before me personally came Colleen Mastroianni, to me known, who being by me duly sworn, did depose and say: that she resides in the County of Hartford, State of Connecticut; that she is the Assistant Vice President of the Companies, the corporations described in and which executed the above instrument; that she knows the seals of the said corporations; that the seals affixed to the said instrument are such corporate seals; that they were so affixed by authority of the Boards of Directors of said corporations and that she signed her name thereto by like authority.

Scott E. Paseka
Notary Public
My Commission Expires October 31, 2007

CERTIFICATE

I, the undersigned, Assistant Vice President of the Companies, DO HEREBY CERTIFY that the above and foregoing is a true and correct copy of the Power of Attorney executed by said Companies, which is still in full force effective as of September 24, 2004

Signed and sealed at the City of Hartford.

Yves Cantin, Assistant Vice President

POA 2003

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Obligee's/*Insured's Name*
City of Tukwila Public Works Dept.
Obligee's/Insured's Mailing Address
Tukwila, WA
Bond/Policy Number
52BSBCQ3975

IMPORTANT NOTICE TO OBLIGEES/POLICYHOLDERS – TERRORISM RISK INSURANCE ACT OF 2002

You are hereby notified that, under the Terrorism Risk Insurance Act of 2002, effective November 26, 2002, we must make terrorism coverage available in your bond/policy. However, the actual coverage provided by your bond/policy for acts of terrorism, as is true for all coverages, is limited by the terms, conditions, exclusions, limits, other provisions of your bond/policy, any endorsements to the bond/policy and generally applicable rules of law.

Any terrorism coverage provided by this bond/policy is partially reinsured by the United States of America under a formula established by Federal Law. Under this formula, the United States will pay 90% of covered terrorism losses exceeding a statutorily-established deductible paid by sureties/insurers until such time as insured losses under the program reach $100 billion. If that occurs, Congress will determine the procedures for, and the source of, any payments for losses in excess of $100 billion.

The premium charge that has been established for terrorism coverage under this bond/policy is either shown on this form or elsewhere in the bond/policy. If there is no premium shown for terrorism on this form or elsewhere in the bond/policy, there is no premium for the coverage.

Terrorism premium:	$0

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SABEY
CONSTRUCTION

VIA FAX & MAIL

September 30, 2004

Bob Benedicto
Building Official
CITY OF TUKWILA BUILDING DEPT.
6300 Southcenter Blvd., Suite 100
Tukwila, WA 98188

RECEIVED
CITY OF TUKWILA
SEP 30 2004
PERMIT CENTER

RE: Dept. of Homeland Security Project
12500 Tukwila International Blvd., Tukwila, WA

Dear Bob;

This letter is to provide you with completion dates for the correction items that were discussed today. We have discussed all the items with our suppliers and have located and procured all the necessary materials and our subcontractors have committed to the following installation dates:

1. Place glass in monumental stairway. Complete 10/4/04
2. Revise hardware to panic hardware on doors T174, T172A, T298C, T235B, T401A, T401B, T401D, and T401E. Complete 10/6/04
3. Install guardrail cap along Sally Port drive at Gridline A. Complete 10/8/04

The Dept. of Homeland Security is scheduled to move into a portion of the 2nd floor and a small portion of the 1st and 4th floor. The earliest staff can move in is 10/12/04 and that may be delayed for several days.

If you have any questions or concerns, please contact me at 206-277-5216

Sincerely,

SABEY CONSTRUCTION INC.

Dean Sabey
Sr. VP of Construction

cc: Doug Gardner

D03-128

ARCHITECTURE
CONSTRUCTION
DEVELOPMENT

Sabey Construction Inc.
12201 Tukwila International Blvd., 4th Floor
Seattle, Washington 98168-5121

206/281-4200 main line
206/281-0920 fax line
www.sabey.com

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City of Tukwila

Department of Community Development

Steven M. Mullet, Mayor

Steve Lancaster, Director

February 12, 2004

Mr. David Leng
12201 Tukwila International Boulevard
Seattle, Washington 98168

RE: CORRECTION LETTER #1 TO REVISION #2
Development Permit Application Number D03-128
12500 Tukwila International Blvd – Dept. of Homeland Security

Dear David:

This letter is to inform you of corrections that must be addressed before your development permit(s) can be approved. All correction requests from each department must be addressed *at the same time* and reflected on your drawings. I have enclosed comments from the Planning Department. At this time, and Building, Public Works and Fire Departments have no comments.

Planning Department: **Brandon Miles, at 206 431-3684, if you have any questions regarding the attached memo.**

Please address the attached comments in an itemized format with applicable revised plans, specifications, and/or other documentation. The City requires that four (4) *complete sets* of revised plans, specifications and/or other documentation be resubmitted with the appropriate revision block.

In order to better expedite your resubmittal, a 'revision sheet' must accompany every resubmittal. I have enclosed one for your convenience. ***Corrections/revisions must be made in person and will not be accepted through the mail or by a messenger service.***

If you have any questions, please contact me at (206) 433-7165.

Sincerely,

Stefania Spencer

Stefania Spencer
Permit Technician

encl

xc: File No. D03-128

6300 Southcenter Boulevard, Suite #100 • Tukwila, Washington 98188 • Phone: 206-431-3670 • Fax: 206-431-3665

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City of Tukwila

Department of Community Development

Steven M. Mullet, Mayor

Steve Lancaster, Director

MEMO

FROM: Brandon J. Miles, Assistant Planner BM

RE: D03-128

DATE: February 11, 2004

The water line layout does not show any irrigation lines in the landscaped area. Please either extend irrigation lines to the landscaped areas or provide a signed letter indicating that irrigation lines will be installed when the landscaped areas are constructed.

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6300 Southcenter Boulevard, Suite #100 • Tukwila, Washington 98188 • Phone: 206-431-3670 • Fax: 206-431-3665

CHS

CHS ENGINEERS, INC.

August 21, 2003

RECEIVED
AUG 21 2003
TUKWILA
PUBLIC WORKS

City of Tukwila
6300 Southcenter Blvd.
Tukwila, WA 98188-2544

Att: **Department of Public Works**

Subject: **King County Water District No. 20**
The Sabey Corporation Developer Extension
Department of Homeland Security INS Building 9

Ladies/Gentlemen:

Attached are three sets of water plans for the proposed improvements to King County Water District No. 20's water system for the above referenced project. The City of Tukwila has previously reviewed these water plans as part of the Sabey Corporation's building permit submittals. The plans have been revised to provide at least 8' of cover above the top of the water pipe in accordance with the City of Tukwila's latest comments regarding their proposed future storm drain.

Please review this material and issue the appropriate construction permits as soon as possible for the installation of the proposed water system improvements. The work includes water main installation in Tukwila International Blvd. as well as on private property. Construction will be in accordance with the District's established construction standards.

Please call me at (425) 637-3693 at any time if you have any questions.

Sincerely,

CHS Engineers, Inc.
Engineers for King County Water District No. 20

Thomas A Partanen

Thomas A. Partanen, P.E.
Project Manager

REVISION NO. 1

:tp

enclosure

cc: King County Water District No. 20, Mr. Ron Malaspino, General Manager
The Sabey Corporation, Mr. Stanley Paulus, Project Manager

a:\tap\26wd20\sabey de tukwila permits

D03-128

12507 BEL-RED ROAD SUITE 101 BELLEVUE, WA 98005-2500 TEL (425) 637-3693 FAX (425) 637-3694

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EC1-050

CHS

CHS ENGINEERS, INC.

July 1, 2003

City of Tukwila Department of Public Works
6300 Southcenter Blvd.
Tukwila, WA 98188-2544

Att: **Mr. Michael Cusick, P.E.**

Subject: **King County Water District No. 20**
Sabey Corporation Developer Extension
Department of Homeland Security Building 9

Dear Mr. Cusick:

I refer to your review comments of May 20, 2003 and have the following summary of responses:

1. Sheet W1. General notes have been revised in accordance with the review comments. King County Water District phone number and address have been added in a note.
2. Sheet W2. The water main has been moved out into the first traffic lane away from the sanitary sewer and fiber optic line. Distance from the centerline of the highway is 24' giving about 8' to the future curb line in accordance with the City's standard location.
   The fiber optic line has been shown
   The crossing note has been revise to indicate boring of the casing.
   Restrained joints are being used where the water main is installed in a casing under the highway and under the walls and where the pipe slope is steep. Restrained joints have not been used where the water main is installed in a normal open trench method in the access road, driveway or in front of the building.
3. Sheet W3. Water main location has been moved out into the first traffic lane away from the poles.
   A note has been added to coordinate support for the poles with the power company if needed.
   A Reduced pressure backflow device and hot box has been added on the domestic service to the main building.
4. Sheet W7. The casing has been extended to the easterly right of way line.

Please call if you have any questions.

Sincerely,

CHS Engineers, Inc.
Engineers for King County Water District No. 20

Thomas A. Partanen

Thomas A. Partanen, P.E.
Project Manager

cc: King County Water District No. 20 - Mr. Ron Malaspino, General Manager
The Sabey Corporation - Mr. Stanley Paulus

a:\tap\26wd20\sabey de tukwila response

RECEIVED
CITY OF TUKWILA
JUL 01 2003
PERMIT CENTER

CORRECTION
LTR# 1
D03-128

12507 BEL-RED ROAD SUITE 101 BELLEVUE, WA 98005-2500 TEL (425) 637-3693 FAX (425) 637-3694

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SCANNED

CHS

CHS ENGINEERS, INC.

July 1, 2003

City of Tukwila Department of Public Works
6300 Southcenter Blvd.
Tukwila, WA 98188-2544

Att: **Mr. Michael Cusick, P.E.**

Subject: **King County Water District No. 20**
Sabey Corporation Developer Extension
Department of Homeland Security Building 9

Dear Mr. Cusick:

I refer to your review comments of May 20, 2003 and have the following summary of responses:

1. Sheet W1. General notes have been revised in accordance with the review comments. King County Water District phone number and address have been added in a note.
2. Sheet W2. The water main has been moved out into the first traffic lane away from the sanitary sewer and fiber optic line. Distance from the centerline of the highway is 24' giving about 8' to the future curb line in accordance with the City's standard location.
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3. Sheet W3. Water main location has been moved out into the first traffic lane away from the poles.
   A note has been added to coordinate support for the poles with the power company if needed.
   A Reduced pressure backflow device and hot box has been added on the domestic service to the main building.
4. Sheet W7. The casing has been extended to the easterly right of way line.

Please call if you have any questions.

Sincerely,

CHS Engineers, Inc.
Engineers for King County Water District No. 20

Thomas A Partanen

Thomas A. Partanen, P.E.
Project Manager

cc: King County Water District No. 20 - Mr. Ron Malaspino, General Manager
The Sabey Corporation - Mr. Stanley Paulus

a:\tap\26wd20\sabey de tukwila response

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CITY OF TUKWILA
JUL 01 2003
PERMIT CENTER

CORRECTION
LTR# 1

D03-128

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12507 BEL-RED ROAD SUITE 101 BELLEVUE, WA 98005-2500 TEL (425) 637-3693 FAX (425) 637-3694

City of Tukwila

Department of Community Development

Steven M. Mullet, Mayor

Steve Lancaster, Director

June 24, 2003

Stanley Paulus
Sabey Corporation
12201 Tukwila International Bl
4th Floor
Seattle, WA 98168

RE: CORRECTION LETTER #1
DHS – Seattle District Office – Shell and Core – D03-128
12500 Tukwila International Bl

Dear Mr. ~~Paulus~~: Stanley

This letter is to inform you of corrections that must be addressed before your development permits can be approved. All correction requests from each department must be addressed *at the same time* and reflected on your drawings. I have enclosed comments from the Building Division and Public Works Department. At this time, the Fire Department and Planning Division have no comments.

Please address the attached comments in an itemized format with applicable revised plans, specifications, and/or other documentation. The City requires that four (4) *complete sets* of revised plans, specifications and/or other documentation be resubmitted with the appropriate revision block.

In order to better expedite your resubmittal, a 'revision sheet' must accompany every resubmittal. I have enclosed one for your convenience. **Corrections/revisions must be made in person and will not be accepted through the mail or by a messenger service.**

If you have any questions, please contact me at (206)431-3670.

Sincerely,

Brenda Holt
Permit Coordinator

encl

c: File No. D03-128

6300 Southcenter Boulevard, Suite #100 • Tukwila, Washington 98188 • Phone: 206-431-3670 • Fax: 206-431-3665

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Tukwila Building Division
6300 SouthCenter Blvd.
Tukwila, WA 98188
206-431-3670

BUILDING DIVISION REVIEW

Date: June 11, 2003
Project Name: **DHS – Core and Shell** permit application
Application #: D03-128
Plan Review: Ken Nelsen, Senior Plans Examiner

An initial Building Department plan review has been completed for the subject project. In general, the construction information within the plans documents submitted as of this date, do not raise outstanding issues that would require additional revisions by this Department. However, before the final plan review approval, a revised cover sheet (plan sheet number A-0) and any supporting documents addressing the items discussed at our meeting June 9, 2003 are required. Those items include the detailed references from U.B.C. Section 403 such as Sprinkler system water supply, Smoke control operations, Elevators, Standby Power, and Area of evacuation assistance details per Section 1104, etc. A limited follow-up review will be conducted regarding these items.

In addition, a brief subsequent Building Department plan review will also take place following the final structural approval by Reed Middleton Engineers.

Should there be questions on the comments, please feel free to contact the Building Division office at 206-431-3670.

No further comments at this time.

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PUBLIC WORKS DEPARTMENT COMMENTS

DATE: May 20, 2003

PROJECT: DHS – Seattle District Office

PERMIT NO: D03-128

PLAN REVIEWER: Contact Mike Cusick at (206) 433-0179 if you have any questions regarding the following comments.

1) Please fill in the T.I.R. worksheet and have it signed by Mr. Garr.
2) Revise major drainage basins map figure #3. The south half of the Fostoria Basin is the Southgate Creek Basin. The north half of the basin is the Fostoria Basin.
3) Provide full size drawing for the north basin map figure "C." The text is getting lost in the background.
4) Provide better basin maps with tables to prove the areas add up to what was used in calculations for each basin study.
5) Check the calculations for north and south wet pond. I get different numbers than you do.
6) Use Seattle not Tacoma in calculations for conveyance.

Sheet C5

1) Show street name on plan sheet.
2) Provide pavement section for improvements on T.I.B.
3) Add note to remove power poles from the sidewalk along east side of T.I.B.
4) Provide profile and plan for 34th Avenue South.
5) Provide profile and plan for South 126th Street.
6) In south driveway, adjust manhole rim to finish grade.
7) Provide profile and plan for improvements to T.I.B.

Sheet 6

1) A fence is required at the top of the modular block wall if there is more than 30" between the top of the wall and the bottom of the wall.
2) What happens to the temporary storm pond at the north end of the site? The plans need to address site restoration.

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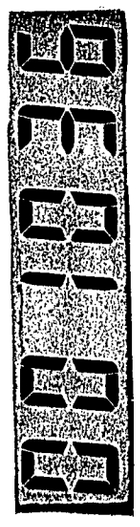

Sheet 7

1) Road section "A" does not match the typical pavement section shown in the upper right hand corner of sheet C7. What are the 2' benches at the edge of the road?
2) Provide 6" wide concrete wall at the back of curb ramp detail "E."

Sheet C8

1) Revise the storm notes on Sheet C8. See Sheet C8 for comments.
2) Label street name on plan sheet.

Sheet C9

1) Check calculations for storm drain leaving the vault. There is a bust in the calculations.
2) Per the King County Manual, one anchor pipe section is required for D.I.P. per table 4.2.14.
3) Fix bypass line text on drawing.

Sheet C12

1) Revise sanitary sewer notes. See Sheet C12 for comments.

Sheet C14

1) The scales on profile and plan sheet must be the same scale.
2) The profile needs to show the water lines crossing the sanitary sewer lines.
3) The contractor is required to provide 2" pavement overlay on the south half of South 126th.

Sheet W1

1) Revise general notes. See redlines.
2) Provide phone number for water district on the plan sheet.

Sheet W2

1) Provide a minimum of 10' between existing sanitary sewer line and the proposed 12" water line.
2) Show existing fiber lines on the plan sheets.
3) The contractor shall only bore across the road. Jacking will not be permitted.
4) All water line joints shall be restrained. Typical all sheets.

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Sheet W3

1) Water line should not go through power poles. Please revise plan sheet.
2) The contractor shall coordinate with Seattle City Light to support poles during the installation of the water line.
3) Provide a reduced pressure device and hot box on the domestic water service to the Department of Homeland Security Building.

Sheet W7

1) In detail A, extend the steel sleeve to the east R.O.W. lines.

(P:Laurie Admin/Mike/Comments D03-131)

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DOCUMENT IMAGING

June 19, 2003

DAVID EVANS
AND ASSOCIATES INC.

RECEIVED
CITY OF TUKWILA
JUL 01 2003
PERMIT CENTER

Michael P. Cusick, P.E.
City of Tukwila Public Works
6300 Southcenter Boulevard
Tukwila, Washington 98188-2544

SUBJECT: PERMIT D03-128/ SABEY – INS BUILDING

Dear Mike:

Please find the following information, and the design changes found in both the TIR and on the Grading Plans, as response to your comments dated May 20, 2003.

1. *Please fill in the T.I.R. worksheet and have it signed by Mr. Garr.*

   The worksheet has been completed and signed.

2. *Revise major drainage basins map figure #3. The south half of the Fostoria Basin is the Southgate Creek Basin. The north half of the basin is the Fostoria Basin.*

   Figure 3 has been revised to show both the Fostoria Basin and the Southgate Creek Basin.

3. *Provide full size drawing for the north basin map figure "C". The text is getting lost in the background.*

   Full-size figures for the North Pond Basin Map and Conveyance Map are now included as Figures 6 and 6a respectively. They are located in a pocket flap in the back of the T.I.R.

4. *Provide better basin maps with tables to prove the areas add up to what was used in calculations for each basin study.*

   Tables have been added to the pond and vault basin maps with the corresponding sub-basin areas listed.

5. *Check the calculations for north and south wet pond. I get different numbers than you do.*

   The water quality calculations for the north and south basins are correct. The discrepancy between hand-calculated values and the spreadsheet values were due to a rounding difference. The number of significant figures in the mean annual runoff has been increased to demonstrate this.

6. *Use Seattle not Tacoma in calculations for conveyance.*

   Rainfall coefficients for Seattle are now used for the conveyance calculations.

Sheet C5

1. *Show street name on plan sheet.*

   The street name for Tukwila International Boulevard has been added.

CORRECTION
LTR# 1

D03-128

Twenty five years

1620 West Marine View Drive Suite 200 Everett Washington 98201 Telephone: 425.259.4099 Facsimile: 425.259.3230

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EDMS
D03-128

2. *Provide pavement section for improvements on T.I.B.*

   The improvements to T.I.B. will be done under a separate permit set. A note on the plans stipulates this.

3. *Add note to remove power poles from the sidewalk along east side of T.I.B.*

   Note added.

4. *Provide profile and plan for 34th Avenue South.*

   Profile added to Sheet C7.

5. *Provide profile and plan for South 126th Street.*

   Profile added to Sheet C7.

6. *In south driveway, adjust manhole rim to finish grade.*

   A note to adjust manhole has been added.

7. *Provide profile and plan for improvements to T.I.B.*

   See Number 2 above.

Sheet C6

1. *A fence is required at the top of the modular block wall if there is more than 30" between the top of the wall and the bottom of the wall.*

   A fence has been added to all fill walls. No fences are proposed on the two (2) cut walls (northerly access road or southwest corner wall).

2. *What happens to the temporary storm pond at the north end of the site? The plans need to address site restoration.*

   A note has been added for pond removal and pavement restoration.

Sheet C7

1. *Road section "A" does not match the typical pavement section shown in the upper right hand corner of sheet C7. What are the 2' benches at the edge of the road?*

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Road Section A shows a typical section at the location note on the plan. The 2-foot dimension is for the road shoulder. The typical pavement section indicates the pavement thickness and material. It also indicates the necessary support for the extruded curb (6 inches behind the curb). These sections do not match as they are describing two different conditions.

2. *Provide 6" wide concrete wall at the back of the curb ramp detail "E".*

   A 6-inch curb has been added at the back of the curb ramp detail.

Sheet C8

1. *Revise the storm notes on Sheet C8. See Sheet C8 for comments.*

   Storm notes have been revised.

2. *Label street name on plan sheet.*

   Street name has been added.

Sheet C9

1. *Check calculations for storm drain leaving the vault. There is a bust in the calculations.*

   Plan has been revised to reflect calculations.

2. *Per the King County Manual, one anchor pipe section is required for DIP per table 4.2.14.*

   Additional pipe anchors have been provided.

3. *Fix bypass line text on drawing.*

   The text has been moved.

Sheet C12

1. *Revise sanitary sewer notes. See Sheet C12 for comments.*

   The sanitary sewer notes have been revised and the sheet has been renamed Sheet SS1.

Sheet C14

1. *The scales on profile and plan sheet must be the same scale.*

   The scales have been revised and the sheet has been renamed Sheet SS1.

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2. *The profile needs to show the water lines crossing the sanitary sewer lines.*

   The profile has been revised and the sheet has been renamed Sheet SS1.

3. *The contractor is required to provide 2" pavement overlay on the south half of South 126th.*

   A detail has been added and the sheet has been renamed Sheet SS1.

Please note that Sheets C12, C13, and C14 have been removed from the plan set. Sheets SS1 and SS2 have been added for the sewer design.

All of your comments pertaining to design of the water system are to be addressed by CHS and KCWD 20. Please call me if you have any questions or require additional information.

Sincerely,

DAVID EVANS AND ASSOCIATES, INC.

Errol F. Garr, P.E.
Senior Vice President

Copies: Sabey Corp.

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[DASC0021]

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DAVID EVANS

ReidMiddleton

June 17, 2003
File No. 26-03-005-009-02

RECEIVED
CITY OF TUKWILA
JUN 18 2003
PERMIT CENTER

Engineers
Planners
Surveyors

Mr. Bob Benedicto
City of Tukwila
6300 Southcenter Blvd., Suite 100
Tukwila, WA 98188

Subject: Building Permit Plan Review - Final Submittal
Department of Homeland Security, Shell and Core (D03-128)

Dear Mr. Benedicto:

We reviewed the proposed project for compliance with the structural provisions of the 1997 Edition of the Uniform Building Code as amended and adopted by the City of Tukwila. The applicant has responded successfully to our comments.

Enclosed are one complete set of the revised structural drawings (bound with the originally submitted architectural drawings) and an additional complete set of the revised structural drawings. We are also forwarding the structural calculations, geotechnical report, and correspondence from the structural engineer for your records. If you have any questions or require any additional clarification, please call.

Sincerely,

Reid Middleton, Inc.

Philip Brazil, P.E., S.E.
Senior Engineer

Enclosures
vls\26se\planrevw\tukwila\03\t009r2.doc\prb
cc: Haynes Lund, Sabey Construction
Theodore McDonald, Engineers Northwest

Washington
Oregon
Alaska

Reid Middleton, Inc.
728 134th Street SW
Suite 200
Everett, WA 98204

Ph: 425 741-3800
Fax: 425 741-3900

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ENW ENGINEERS NORTHWEST, INC., P.S.
STRUCTURAL ENGINEERS ~ 6869 WOODLAWN AVE. N. E., SEATTLE, WA 98115 (206) 525~7560 FAX (206) 522~6698

June 9, 2003

CITY OF TUKWILA
6300 Southcenter Blvd., Suite 100
Tukwila, WA 98188

ATTN: Mr. Bob Benedicto

RE: Department of Homeland Security
Office Building Foundation

Mr. Benedicto:

The following is my response to Reid Middleton's plan check comments for the shell and core permit submittal for the above-mentioned project. The list is itemized to correspond to their comments, except item number 1 has been skipped, as this item contained only general instructions for this response.

2. a. Grid 4 elevation (Sheet S5.2) has been revised to show 16 bars between P1 and P2.
   b. SectionE-6.1 has been revised. Section F-6.1 has only 12 bars, not 16.
   c. See item b above.

3. Section N-6.1 has been revised.

4. An additional cross tie has been added to Section G-6.1.

5. Boundary zones at Grid 9 (sheet S5.2) have been extended above the third floor.

6. Reinforcing at wall on Grid D at Grid 9 (Sheet S5.5) has been revised to #7@10".

7. Columns were redesigned. Revised calculations and drawings were included in my response to the foundation permit comments.

8. Section C-3.2 has been revised to provide sufficient length to develop #7 bars.

RECEIVED
JUN - 9 2003
REID MIDDLETON

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BLACK & WHITE COPY

9. Drag Strut details have been added to Sheet S6.2.

If you need any additional information, please call.

Sincerely,

ENGINEERS NORTHWEST, INC., P.S.

Theodore D. McDonald, P.E.
Senior Project Engineer

Cc: Philip Brazil, Reid Middleton
Stanley Paulus, Sabey Corporation
Bob Fadden, Lance Mueller and Associates

TM:tn
ENW Project No. 02110000

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FILED

Reid Middleton

File

RECEIVED
MAY 13 2003
COMMUNITY DEVELOPMENT

May 12, 2003
File No. 26-03-005-009-01

Engineers
Planners
Surveyors

Mr. Bob Benedicto
City of Tukwila
6300 Southcenter Blvd., Suite 100
Tukwila, WA 98188

Subject: Building Permit Plan Review - First Submittal
Department of Homeland Security, Shell and Core (D03-128)

Dear Mr. Benedicto:

We reviewed the proposed project for compliance with the structural provisions of the 1997 Edition of the Uniform Building Code as amended and adopted by the City of Tukwila. The permit applicant should address the following comments. Copies of this letter were forwarded to the project contact and structural engineer for your convenience.

General

1. The following list of comments should be responded to in itemized letter form. The permit applicant should have the Engineer of Record respond and resubmit **two copies of revised structural drawings** and one copy of supplemental calculations. **All information should be submitted directly to Reid Middleton, Inc.**

Lateral

2. At the Shear Wall Elevations on Sheets S5.2, S5.4 and S5.5, the references to the Details on sheet S6.1 are not clear and should be revised at the following locations:

   a) Sheet S5.2, Grid 4 Elevation. 18 #9 longitudinal bars are specified between Floors P-1 and P-2, but referenced Detail A/S6.1 contains 16 bars.
   b) Sheet S5.2, Grid 6 Elevation. 12 #8 longitudinal bars are specified above Second Floor, but referenced Details E and F/S6.1 contain 16 bars.
   c) Sheet S5.2, Grid 7 Elevation. 12 #8 longitudinal bars are specified above Second Floor, but referenced Detail F/S6.1 contains 16 bars.

3. At Detail N/S6.1, the area of horizontal confinement reinforcement in the short-way direction should be increased at the 10 ksi concrete areas, per UBC Section 1921.6.6.6(2.1).

Washington
Oregon
Alaska

Reid Middleton, Inc.
728 134th Street SW
Suite 200
Everett, WA 98204

Ph: 425 741-3800
Fax: 425 741-3900

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4. At Detail G/S6.1, a third cross-tie should be specified in the short-way direction per UBC Section 1921.6.6.6(2.4). The spacing between the right cross-tie and right leg of the hoop is approximately 18".

5. The boundary zones at the Shear Wall Elevation at Grid 9 on Sheet S5.2 should be extended above the Third Floor as determined on page L23 of the calculations (Pier P05).

6. The spacing of the horizontal reinforcement should be decreased to 8" o.c. at the concrete shear wall on Sheet S5.5, at Grid D/4 between the First Floor and Floor P1, as determined on page L25 of the calculations.

7. The concrete columns generally do not appear to be assumed in the calculations as contributing to lateral resistance. These columns are required by UBC Section 1921.7.1 to be detailed in accordance with Section 1921.7.2 or 1921.7.3 depending on the magnitude of moments induced in these members when subjected to maximum inelastic response displacements (Δ_M). Substantiating data should be submitted to verify the induced moments and their effect on the design and detailing of the columns. An alternate would be to detail the columns per Section 1921.7.3. If this option is chosen, the drawings should be revised as follows:

   a) Revise the Reinforcing Steel (Special Inspection Required) section of the General Notes on sheet S0.1 to specify ASTM A706 at the longitudinal reinforcement in the columns as well as the boundary elements, per Section 1921.7.3.1 (referenced Section 1921.2.5).
   b) Revise Sections C and E/S3.1 and A/S4.1 to specify transverse reinforcement within the concrete floors and drop panels at least equal to one-half that specified in the columns, per Section 1921.7.3.3 (referenced Section 1921.5.2.1).
   c) Increase the number of cross ties at the Column Schedule on Sheet S4.1 so that the minimum area of transverse reinforcement complies with Section 1921.7.3.3 (referenced Section 1921.4.4).

8. The vertical reinforcement in the exterior foundation walls, which also serve as shear walls per the calculations, generally consists of #7 bars per the Wall Elevations on Sheets S5.1-S5.6 and generally terminates in the First Floor post-tensioned concrete floor per Detail C/S3.2. All reinforcement in shear walls is required to be anchored in accordance with UBC Section 1921.5.4. See Section 1921.6.2.4. The development length for a #7 bar in 5,000 psi concrete is 11.4" per Equation 21.5. The floor is not thick enough to accommodate the required length. The design should be revised to provide sufficient length.

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9. Details should be added to the drawings to review the layout of the longitudinal reinforcement in the drag struts. The are required having a minimum spacing of 3 d_b and a minimum concrete cover of 2.5 d_b (2" minimum), per UBC Section 1921.6.7.3.

Corrections and comments made during the review process do not relieve the project applicant or designer from compliance with code requirements, conditions of approval, and permit requirements; nor is the designer relieved of responsibility for a complete design in accordance with the laws of the state of Washington. This plan review check is for general compliance with the Uniform Building Code as it relates to the project.

If you have any questions or require any additional clarification, please call.

Sincerely,

Reid Middleton, Inc.

Philip Brazil, P.E., S.E.
Senior Engineer

vls\26se\planrevw\tukwila\03\t009r1.doc\prb
cc: Haynes Lund, Sabey Construction
Robert Raichle, Engineers Northwest

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City of Tukwila

Department of Community Development

Steven M. Mullet, Mayor

Steve Lancaster, Director

May 23, 2003

Haynes Lund
Sabey Corporation
12201 Tukwila International Bl
4th Floor
Seattle, WA 98168

RE: Preliminary Review Comments
Department of Homeland Security – INS (Permit No. D03-128)
12500 Tukwila International Bl

Dear Mr. Lund:

The Tukwila Public Works Department has completed their review of the application materials you submitted on April 30, 2003. The attached comments and/or corrections must be addressed before we can recommend approval of your permit(s).

Please be aware that you may receive comments and/or corrections from other City departments, as well. When you re-submit your corrected plans to the Permit Center for further review, your re-submittal must respond to the comments of all City departments at the same time. You will know when you have received the comments of all departments involved with your project, when you receive a "Correction Letter" from the City's Permit Coordinator. **The Permit Center cannot accept your re-submittal until after you have received the Correction Letter reflecting all departmental comments and/or corrections.**

In the meantime, if you have questions regarding the attached Public Works Department comments and/or corrections, please contact Mike Cusick, Development Engineer, at (206)433-0179. If you have other questions regarding the status of your permit application, please contact the Permit Center at (206)431-3670.

Sincerely

Brenda Holt
Permit Coordinator

encl

xc: File No. D03-128

6300 Southcenter Boulevard, Suite #100 • Tukwila, Washington 98188 • Phone: 206-431-3670 • Fax: 206-431-3665

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

PUBLIC WORKS DEPARTMENT COMMENTS

DATE: May 20, 2003

PROJECT: DHS – Seattle District Office

PERMIT NO: D03-128

PLAN REVIEWER: Contact Mike Cusick at (206) 433-0179 if you have any questions regarding the following comments.

1) Please fill in the T.I.R. worksheet and have it signed by Mr. Garr.
2) Revise major drainage basins map figure #3. The south half of the Fostoria Basin is the Southgate Creek Basin. The north half of the basin is the Fostoria Basin.
3) Provide full size drawing for the north basin map figure "C." The text is getting lost in the background.
4) Provide better basin maps with tables to prove the areas add up to what was used in calculations for each basin study.
5) Check the calculations for north and south wet pond. I get different numbers than you do.
6) Use Seattle not Tacoma in calculations for conveyance.

Sheet C5

1) Show street name on plan sheet.
2) Provide pavement section for improvements on T.I.B.
3) Add note to remove power poles from the sidewalk along east side of T.I.B.
4) Provide profile and plan for 34th Avenue South.
5) Provide profile and plan for South 126th Street.
6) In south driveway, adjust manhole rim to finish grade.
7) Provide profile and plan for improvements to T.I.B.

Sheet 6

1) A fence is required at the top of the modular block wall if there is more than 30" between the top of the wall and the bottom of the wall.
2) What happens to the temporary storm pond at the north end of the site? The plans need to address site restoration.

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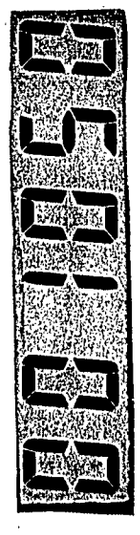

Sheet 7

1) Road section "A" does not match the typical pavement section shown in the upper right hand corner of sheet C7. What are the 2' benches at the edge of the road?
2) Provide 6" wide concrete wall at the back of curb ramp detail "E."

Sheet C8

1) Revise the storm notes on Sheet C8. See Sheet C8 for comments.
2) Label street name on plan sheet.

Sheet C9

1) Check calculations for storm drain leaving the vault. There is a bust in the calculations.
2) Per the King County Manual, one anchor pipe section is required for D.I.P. per table 4.2.14.
3) Fix bypass line text on drawing.

Sheet C12

1) Revise sanitary sewer notes. See Sheet C12 for comments.

Sheet C14

1) The scales on profile and plan sheet must be the same scale.
2) The profile needs to show the water lines crossing the sanitary sewer lines.
3) The contractor is required to provide 2" pavement overlay on the south half of South 126th.

Sheet W1

1) Revise general notes. See redlines.
2) Provide phone number for water district on the plan sheet.

Sheet W2

1) Provide a minimum of 10' between existing sanitary sewer line and the proposed 12" water line.
2) Show existing fiber lines on the plan sheets.
3) The contractor shall only bore across the road. Jacking will not be permitted.
4) All water line joints shall be restrained. Typical all sheets.

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Sheet W3

1) Water line should not go through power poles. Please revise plan sheet.
2) The contractor shall coordinate with Seattle City Light to support poles during the installation of the water line.
3) Provide a reduced pressure device and hot box on the domestic water service to the Department of Homeland Security Building.

Sheet W7

1) In detail A, extend the steel sleeve to the east R.O.W. lines.

(P:Laurie Admin/Mike/Comments D03-131)

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RECEIVED
MAY 29 2003

City of Tukwila

Department of Community Development

Steven M. Mullet, Mayor

Steve Lancaster, Director

May 1, 2003

Dave Swanson, P.E.
Reid Middleton
728 - 134th Street SW, Suite 200
Everett, WA 98204

RE: Structural Review
DHS – Seattle District Office
Core and Shell – D03-128
Foundation – D03-129
North Parking Structure – D03-131

Dear Mr. Swanson:

Please review the enclosed plans and documents for structural compliance with the 1997 Uniform Building Code.

If you should have any questions, please feel free to contact me at (206)431-3672.

Sincerely,

Brenda Holt,
Permit Coordinator

encl

xc: Permit File No. D03-128
Permit File No. D03-129
Permit File No. D03-131

6300 Southcenter Boulevard, Suite #100 • Tukwila, Washington 98188 • Phone: 206-431-3670 • Fax: 206-431-3665

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City of Tukwila

Department of Community Development

Steven M. Mullet, Mayor

Steve Lancaster, Director

May 1, 2003

Haynes Lund
Sabey Corporation
12201 Tukwila International Bl
4th Floor
Seattle, WA 98188

RE: Letter of Complete Application
Permit Application Number D03-128 – DHS Shell and Core
Permit Application Number D03-129 – DHS Foundation
Permit Application Number D03-131 – DHS North Parking Structure
12500 Tukwila International Bl

Dear Mr. Lund:

This letter is to inform you that your permit applications received at the City of Tukwila Permit Center on April 30, 2003, were reviewed at the May 1, 2003, plan review meeting and have been determined to be complete. Your permits have begun the plan review process and you will be notified of any required corrections or when your plans are approved.

If you have any questions, please contact me at the City of Tukwila Permit Center at (206)431-3672.

Sincerely,

Brenda Holt

Brenda Holt
Permit Coordinator

File: D03-128
D03-129
D03-131

6300 Southcenter Boulevard, Suite #100 • Tukwila, Washington 98188 • Phone: 206-431-3670 • Fax: 206-431-3665

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

Haynes Lund

From: Brenda Holt [bholt@ci.tukwila.wa.us]
Sent: Friday, April 18, 2003 3:18 PM
To: Haynes Lund
Cc: Bob Benedicto; Deborah Ritter; Mike Cusick
Subject: Re: DHS Seattle -- submittal schedule

Haynes,

Sorry for the delay in getting back to you. However, after talking with Bob, Mike and Deb the following would be the submittal information for the phasing you are talking about.

Building Foundation
5 complete sets of plans (architectural, structural, civil, landscape, mechanical and electrical)
4 copies of soils report
4 copies of structural calculations
Water Availability Letter - Water District #125
Sewer Availability Letter - Val Vue Sewer District

Shell and Core
5 complete sets of plans (architectural, structural, civil, landscape, mechanical and electrical)
4 copies of structural calculations
2 copies of 2001 Energy Code Compliance Form, LIGHTING CALC'S & CUT SHEETS
1 Non-Residential Sewer Use Certification Form
4 SURFACE WATER TECHNICAL INFORMATION REPORT

North Parking Structure
5 complete sets of plans (architectural, structural, civil, landscape, mechanical and electrical)
4 copies of soils report
4 copies of structural calculations

If you would like to talk about the specifics, please feel free to contact me.

Thanks,
Brenda

Brenda Holt
Permit Coordinator
City of Tukwila
6300 Southcenter Bl, #100
Tukwila, WA 98188
Email: bholt@ci.tukwila.wa.us
Phone: (206)431-3672
Fax: (206)431-3665

>>> "Haynes Lund" <HaynesL@sabey.com> 04/08/2003 3:29:27 PM >>>
Brenda:
Attached is the updated submittal schedule for the DHS Seattle District Office. The design team now plans to submit all the Core & Shell drawings at the same time -- architectural, structural, civil, landscape, mechanical and electrical. From this package of drawings we would be applying for 3 permits: Building Foundations, Building Core and

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PLAN REVIEW/ROUTING SLIP

ACTIVITY NUMBER: D03-128 **DATE:** 02-19-04

PROJECT NAME: DHS – SEATTLE DISTRICT OFFICE

SITE ADDRESS: 12500 TUKWILA INTERNATIONAL BLVD

___Original Plan Submittal ___Response to Incomplete Letter #___

X Response to Correction Letter #1 to X Revision #2 after/~~before~~ permit is issued

DEPARTMENTS:

BM AP 2-24-04

Building Division	☐	Fire Prevention	☐	Planning Division	☒
Public Works	☐	Structural	☐	Permit Coordinator	☒

DETERMINATION OF COMPLETENESS: (Tues., Thurs.) DUE DATE: 02-24-04

Complete ☑ Incomplete ☐ Not Applicable ☐

Comments: _____

Permit Center Use Only

INCOMPLETE LETTER MAILED:_____ **LETTER OF COMPLETENESS MAILED:**_____

Departments determined incomplete: Bldg ☐ Fire ☐ Plng ☐ PW ☐ Staff Initials:_____

TUES/THURS ROUTING:

Please Route ☑ Structural Review Required ☐ No further Review Required ☐

REVIEWER'S INITIALS: _____ DATE: _____

APPROVALS OR CORRECTIONS: DUE DATE: 03-23-04

Approved ☑ Approved with Conditions ☐ Not Approved (attach comments) ☐

Notation: _____

REVIEWER'S INITIALS: _____ DATE: _____

Permit Center Use Only

CORRECTION LETTER MAILED:_____

Departments issued corrections: Bldg ☐ Fire ☐ Plng ☐ PW ☐ Staff Initials:_____

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2-28-02

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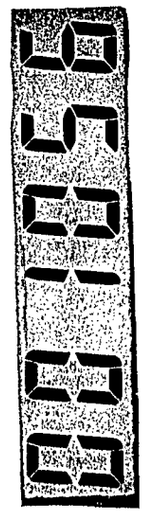

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PLAN REVIEW/ROUTING SLIP

ACTIVITY NUMBER: D03-128 **DATE:** 01-30-04

PROJECT NAME: DEPT. OF HOMELAND SECURITY

SITE ADDRESS: 12500 TUKWILA INTERNATIONAL BLVD

___Original Plan Submittal ___Response to Incomplete Letter #___

___Response to Correction Letter #___ __X__Revision # 2 after/~~before~~ permit is issue

DEPARTMENTS:

KEN N/A 2-2-04 Building Division	☑	DT N/A 2-3-04 Fire Prevention	☑	BM ~~approved~~ denied 2-11-04 Planning Division	☑
Public Works MRC AWC 2-12-04	☑	Structural	☐	Permit Coordinator	X

DETERMINATION OF COMPLETENESS: (Tues., Thurs.) DUE DATE: 02-03-04

Complete ☑ Incomplete ☐ Not Applicable ☐

Comments: _____

Permit Center Use Only

INCOMPLETE LETTER MAILED:_____ **LETTER OF COMPLETENESS MAILED:**_____

Departments determined incomplete: Bldg ☐ Fire ☐ Plng ☐ PW ☐ Staff Initials:_____

TUES/THURS ROUTING:

Please Route ☑ Structural Review Required ☐ No further Review Required ☐

REVIEWER'S INITIALS: _____ DATE: _____

APPROVALS OR CORRECTIONS: DUE DATE: 03-02-04

Approved ☐ Approved with Conditions ☐ Not Approved (attach comments) ☑

Notation: _____

REVIEWER'S INITIALS: _____ DATE: _____

Permit Center Use Only

CORRECTION LETTER MAILED: 2-12-04

Departments issued corrections: Bldg ☐ Fire ☐ Plng ☒ PW ☐ Staff Initials: SLS.

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PLAN REVIEW/ROUTING SLIP

ACTIVITY NUMBER: D03-128 **DATE:** 07-02-03

PROJECT NAME: DHS – SHELL AND CORE

SITE ADDRESS: 12500 TUKWILA INTERNATIONAL BL

____ Original Plan Submittal ____ Response to Incomplete Letter # ____

X Response to Correction Letter # 1 ____ Revision #____ After Permit Is Issued

DEPARTMENTS:

Building Division	☐	Fire Prevention	☐	Planning Division	☐
Public Works	☑	Structural	☐	Permit Coordinator	☒

MPC AWC 7-25-03

DETERMINATION OF COMPLETENESS: (Tues., Thurs.) DUE DATE: 07-03-03

Complete ☑ Incomplete ☐ Not Applicable ☐

Comments: _____

Permit Center Use Only

INCOMPLETE LETTER MAILED:_____ **LETTER OF COMPLETENESS MAILED:**_____

Departments determined incomplete: Bldg ☐ Fire ☐ Plng ☐ PW ☐ Staff Initials:_____

TUES/THURS ROUTING:

Please Route ☑ Structural Review Required ☐ No further Review Required ☐

REVIEWER'S INITIALS: _____ DATE: _____

APPROVALS OR CORRECTIONS: DUE DATE: 07-31-03

Approved ☐ Approved with Conditions ☑ Not Approved (attach comments) ☐

Notation: _____

REVIEWER'S INITIALS: _____ DATE: _____

Permit Center Use Only

CORRECTION LETTER MAILED:_____

Departments issued corrections: Bldg ☐ Fire ☐ Plng ☐ PW ☐ Staff Initials:_____

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PLAN REVIEW/ROUTING SLIP

ACTIVITY NUMBER: D03-128 **DATE:** 4-30-03

PROJECT NAME: DHS – SEATTLE DISTRICT OFFICE

SITE ADDRESS: 12500 TUKWILA INTERNATIONAL BL

X Original Plan Submittal _____ Response to Incomplete Letter #____

_____ Response to Correction Letter #_____ _____ Revision # ____ After Permit Is Issued

DEPARTMENTS:

Building Division [•] Ken denied 6-11-03	Fire Prevention [•] MSI AWC 6-3-03	Planning Division [•] BM AP 6-23-03
Public Works [•] MPC denied 5-20-03	Structural [•]	Permit Coordinator [X]

DETERMINATION OF COMPLETENESS: (Tues., Thurs.) DUE DATE: 5-1-03

Complete [✓] Incomplete [ ] Not Applicable [ ]

Comments: _____

Permit Center Use Only

INCOMPLETE LETTER MAILED:_____ **LETTER OF COMPLETENESS MAILED:**_____

Departments determined incomplete: Bldg [ ] Fire [ ] Plng [ ] PW [ ] Staff Initials:_____

TUES/THURS ROUTING:

Please Route [✓] Structural Review Required [✓] No further Review Required [ ]

REVIEWER'S INITIALS: _____ DATE: _____

APPROVALS OR CORRECTIONS: DUE DATE: 5-29-03

Approved [ ] Approved with Conditions [ ] Not Approved (attach comments) [✓]

Notation: _____

REVIEWER'S INITIALS: _____ DATE: _____

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CORRECTION LETTER MAILED: 6-24-03

Departments issued corrections: Bldg [✓] Fire [ ] Plng [ ] PW [✓] Staff Initials: BM

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2-28-02

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PROJECT NAME: DHS DISTRICT OFFICE PERMIT NO.: D03-128
Site Address: 12500 TEB Original Issue Date: 8-8-03

REVISION LOG

Revision No.	Date Received	Staff Initials	Date Issued	Staff Initials
1	8-21-03	LAW/JMC	9-5-03	
Summary of Revision: Revised water plans providing 8' of cover above top of water pipe in accordance w/ City's latest comments for proposed future storm drain. Received By: (please print)				

Revision No.	Date Received	Staff Initials	Date Issued	Staff Initials
2	1-30-04	LAW	2-25-04	SFS
Summary of Revision: Revising water due to revision of parking area. Received By: DAVID LENG (please print)				

Revision No.	Date Received	Staff Initials	Date Issued	Staff Initials
Summary of Revision:				
Received By: (please print)				

Revision No.	Date Received	Staff Initials	Date Issued	Staff Initials
Summary of Revision:				
Received By: (please print)				

Revision No.	Date Received	Staff Initials	Date Issued	Staff Initials
Summary of Revision:				
Received By: (please print)				

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City of Tukwila
Department of Community Development - Permit Center
6300 Southcenter Blvd, Suite 100
Tukwila, WA 98188
(206)431-3670

REVISION SUBMITTAL

Revision submittals must be submitted in person at the Permit Center. Revisions will not be accepted through the mail, fax, etc.

Date: 2/19/04 Plan Check/Permit Number: D03-128

☐ Response to Incomplete Letter #____

☒ Response to Correction Letter # 1

☒ Revision # 2 **after**/~~before~~ Permit is Issued

☐ Revision requested by a City Building Inspector or Plans Examiner

Project Name: **DEPT. OF HOMELAND SECURITY**

Project Address: **12500 TUKWILA INTERNATIONAL BLVD**

Contact Person David Leng Phone Number 206/277-5269

Summary of Revision: Irrigation L2.01 & L2.02 for Revised Parking Facility at D&S SEE D04-026

RECEIVED
CITY OF TUKWILA
FEB 19
PERMIT CENTER

Sheet Number(s): L2.01 & L2.02
"Cloud" or highlight all areas of revision including date of revision

Received at the City of Tukwila Permit Center by: SKS

☒ Entered in Sierra on 2-19-04

02/12/04

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City of Tukwila
Department of Community Development - Permit Center
6300 Southcenter Blvd, Suite 100
Tukwila, WA 98188
(206)431-3670

REVISION SUBMITTAL

Revision submittals must be submitted in person at the Permit Center. Revisions will not be accepted through the mail, fax, etc.

Date: 1/30/04 Plan Check/Permit Number: 03-128

- ☐ Response to Incomplete Letter # _____
- ☐ Response to Correction Letter # _____
- ☒ Revision # 2 after Permit is Issued
- ☐ Revision requested by a City Building Inspector or Plans Examiner

Project Name: DHS
Project Address: 12500 T.I.B.
Contact Person: David Leng Phone Number: 206/277-5269
Summary of Revision:
Revise Water Due to Revision of Parking Area

RECEIVED
CITY OF TUKWILA
JAN 30 2004
PERMIT CENTER

Sheet Number(s): W1 - W7
"Cloud" or highlight all areas of revision including date of revision

Received at the City of Tukwila Permit Center by: LAW

☑ Entered in Permits Plus on 01/30/04

08/06/03

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City of Tukwila
Department of Community Development - Permit Center
6300 Southcenter Blvd, Suite 100
Tukwila, WA 98188
(206)431-3670

REVISION SUBMITTAL

Revision submittals must be submitted in person at the Permit Center. Revisions will not be accepted through the mail, fax, etc.

Date: 07/10/03 Plan Check/Permit Number: D03-128

☐ Response to Incomplete Letter # _____

☒ Response to Correction Letter # _____

☐ Revision # _____ after Permit is Issued

Project Name: DHS - SHELL + CORE

Project Address: 12500 TUKWILA INTERNATIONAL BLVD.

Contact Person: STANLEY PAULUS Phone Number: 206.277.5273

Summary of Revision: CORRECTIONS TO CIVIL DRAWINGS PER PUBLIC WORKS COMMENTS + RED LINES.

RECEIVED
CITY OF TUKWILA
JUL 10 2003
PERMIT CENTER

Sheet Number(s): _____

"Cloud" or highlight all areas of revision including date of revision

Received at the City of Tukwila Permit Center by: SFS

☒ Entered in Sierra on 7-10-03

08/30/00

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City of Tukwila
Department of Community Development - Permit Center
6300 Southcenter Blvd, Suite 100
Tukwila, WA 98188
(206)431-3670

REVISION SUBMITTAL

Revision submittals must be submitted in person at the Permit Center. Revisions will not be accepted through the mail, fax, etc.

Date: _____ Plan Check/Permit Number: D03-128

☐ Response to Incomplete Letter # _____
☒ Response to Correction Letter # 1
☐ Revision # _____ after Permit is Issued

Project Name: **DHS – SHELL AND CORE**

Project Address: 12500 Tukwila International Bl

Contact Person: Stanley Paulus Phone Number: 206.277.5273

Summary of Revision:
PLEASE SEE ATTACHED
1. (4) SETS OF REVISED DRAWINGS (ARCH, CIVIL, WATER, MECH, ELECT.)
2. LETTER FROM DAVID EVANS & ASSOCIATES ADDRESSING CIVIL COMMENTS (4 COPIES) WITH REVISED SURFACE WATER REPORT (4 COPIES)
3. LETTER FROM CHS ENGINEERS INC. ADDRESSING WATER ISSUES.
4. (4) COPIES OF ADDENDUM GEOTECH REPORT ISSUED BY EARTH CONSULTANTS ON JUNE, 11, 2003.
5. ORIGINAL PERMIT DRAWINGS WITH CITY COMMENTS AND REDMARKS.

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JUL 01 2003
PERMIT CENTER

Sheet Number(s): _____
"Cloud" or highlight all areas of revision including date of revision

Received at the City of Tukwila Permit Center by: _____

☒ Entered in Permits Plus on 7-1-03

06/24/03

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Non-Residential Sewer Use Certification

(To be completed for all new sewer connections, reconnections or change of use of existing connections.
This form does not apply to repairs or replacements of existing sewer connections within five years of disconnect.)

Pursuant to King County Ordinance No. 11034, all sewer customers who establish a new service which uses metropolitan sewage facilities after February 1, 1990 shall be subject to a capacity charge. The amount of the charge is established annually by the King County Council but is limited by state law to $10.50 per month per residential customer or residential customer equivalent for a period of fifteen years. The purpose of the charge is to recover costs of providing sewage treatment capacity for new sewer customers. The charge is collected semi-annually. All future billings can be prepaid at a discounted amount.

Questions regarding the capacity charge or this form should be referred to King County's Wastewater Treatment Division at (206) 684-1740.

(Please print or type)

Owner's Name INTERNATIONAL GATEWAY EAST III, LLC
(Last, First, Middle Initial)

Property Legal Address:

Subdivision Name _____ Lot # _____

Subdiv. # _____ Block # _____

Property Street Address
12500 TUKWILA INTERNATIONAL BLVD.

City, State, Zip TUKWILA, WA 98168

Owner's Phone Number (206) 281-8700

Owner's Mailing Address (if different from above)
12201 TUKWILA INTERNATIONAL BLVD
FOURTH FLOOR
SEATTLE, WA 98168-5121

Property Tax ID # 734060-0581, 734060-0885, 734060-0602, 102304-9080, 102304-9082

Building Name (if applicable) DEPT. OF HOMELAND SECURITY

Party to be Billed (if different from owner) SABEY CORPORATION

Party's Mailing Address:
12201 TUKWILA INTERNATIONAL BLVD
FOURTH FLOOR
SEATTLE, WA 98168-5121

or

Property Contact Phone # (206) 281-8700

City or Sewer District VAL-VUE

Date of Connection 7/31/04

Side Sewer Permit # D03-128

Demolition of pre-existing building? ☒ Yes ☐ No

Demolition Permit # D03-088

A. Fixture Units

Fixture Units x Number of Fixtures = Total Fixture Units

Kind of Fixture	Fixture Units Public	Fixture Units Private	No. of Fixtures Public	No. of Fixtures Private	Total Fixture Units
Bathtubs and/or shower	4	2			
Dental units	1	1			
Dishwasher	4	2			
Drinking fountain (each head)	1	1	8		8
Hose bibb (interior)	5	3			
Clotheswasher or laundry tub	4	2			
Sink, bar or lavatory	2	1	14	30	58
Sink, clinic, flushing	10	10			
Sink, kitchen	4	2			
Sink, other	4	2			
Sink wash, circle spray	4	4			
Urinal, flush tank	3	3			
Urinal, wall or stall	5	5	3	10	65
Water closet, tank	5	3			
Water closet, flush valve	10	6	13	32	322
				Total Fixture Units	453

Residential Customer Equivalent (RCE)
20 fixture units equal 1.0 RCE

$\frac{\text{Total No. of Fixture Units}}{20}$ = 22.65 RCE

For King County use:

Account # _____

Monthly Rate _____

Six Month Due _____

B. Other Wastewater Flow

(in addition to Fixture Units identified in Section A)

Type of Facility/Process:

—

Estimated Wastewater Discharge:

— Gallons/days

Residential Customer Equivalents (RCE):
187 gallon per day equals 1.0 RCE

$\frac{\text{Total Discharge (gal/day)}}{187}$ = _____ RCE

C. Total Residential Customer Equivalents:

(add A & B)

A + 22.65

B —

= 22.65 RCE

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D03-128

I certify that the information given is correct. I understand that the capacity charge levied will be based on this information and any deviation will require resubmission of corrected data for determination of a revised capacity charge.

Signature of Owner/ Representative _____

Print Name of Owner/ Representative HAYNES LUND

Date 30 APRIL 03

1058 (Rev. 2/00) White – King County Yellow – Local Sewer Agency Pink – Sewer Customer

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D03-128

CITY OF TUKWILA
Permit Center
6300 Southcenter Boulevard, Suite 100, Tukwila, WA 98188
Telephone: (206) 431-3670

H-11a

Certificate of Water Availability

PROJECT #: D03-128 *(Required only if outside City of Tukwila water utility district)*

PART A: *(To be completed by applicant)*

Site Address (Attach map and Legal Description showing hydrant location and size of main):
12500 Tukwila International Blvd.

Owner Information:	Agent/Contact Person:
Name: International Gateway East III LLC	Name: Haynes Lund
Address: 12201 Tukwila Intnl. Blvd, Seattle, WA 98168	Address: 12201 Tukwila Intl. Blvd, Seattle, WA 98168
Phone: 206-281-8700	Phone: 206-277-5219

This certificate is for the purposes of:

- ☐ Residential Building Permit
- ☐ Preliminary Plat
- ☐ Short Subdivision
- ☒ Commercial/Industrial Building Permit
- ☐ Rezone
- ☐ Other

Estimated number of service connections and meter size(s): 1, 3" meter

Vehicular distance from nearest hydrant to the closest point of structure 60 ft.

Area is served by *(Water utility district)*: Water District 20

Owner/Agent Signature: International Gateway East III LLC, by Sabey Corporation, Manager, by James D. Haynes, CFO — Date: 1/28/03

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PART B: *(To be completed by water utility district)*

The proposed project is located within City of Tukwila/King Co *(City/County)*

The improvements required to upgrade the water system to bring it into compliance with the utilities' comprehensive plan or to meet the minimum flow requirements of the project before connection:
With improvements to Water District 20's system, the system will be capable of producing 3500 gpm @ 20 psi. Please see Hydraulic Study for Gateway East.
(Use separate sheet if more room is needed)

Based upon the improvements listed above, water can be provided and will be available at the site with a flow of 3500 gpm at 20 psi residual for a duration of 2 hours at a velocity of 5 fps as documented by the attached calculations.

I hereby certify that the above information is true and correct.

King Co Water Dist 20/206-243-3990 — By — 01-28-2003
Agency/Phone *By* *Date*

PART C: *(To be completed by governing jurisdiction)*

Water Availability:
- ☐ Acceptable service can be provided to this project
- ☐ Acceptable service cannot be provided to this project unless the improvements in item C2 are met.
- ☐ System isn't capable of providing service to this project.

Minimum water system improvements: (At least equal to B2 above)

(Use separate sheet if more room is needed)

Agency/Phone *By* *Date*

W:\PRA\WP\DOC\6\5\06

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LOCATION

99-165

"WORKING TOWARD A BETTER ENVIRONMENT"

ValVue SEWER DISTRICT

14816 Military Road South
P.O. Box 69550
Tukwila, WA 98168
Phone: (206) 242-3236
Fax: (206) 242-1527

CERTIFICATE OF SEWER AVAILABILITY/NON-AVAILABILITY

☒ Certificate of Sewer Availability OR ☐ Certificate of Sewer Non-Availability

Part A: (To Be Completed by Applicant)

Purpose of Certificate:
☒ Building Permit ☐ Preliminary Plat or PUD ☐ Other _____
☐ Short Subdivision ☐ Rezone

Proposed Use:
☐ Residential Single Family ☐ Residential Multi-Family ☒ Commercial ☐ Other

Applicants Name: Sabey Corp Phone: 425-259-4099 Errol Gorr

Property Address or Approximate Location:
west of 3417 S. 120th

Legal Description(Attach Map and Legal Description if necessary):
attached

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Part B: (To Be Completed by Sewer Agency)

1. ☒ a. Sewer Service will be provided by side sewer connection only to an existing 8" size sewer 450' feet from the site and the sewer system has the capacity to serve the proposed use.

OR ☐ b. Sewer service will require an improvement to the sewer system of:
- ☐ (1) _____ feet of sewer trunk or lateral to reach the site; and/or
- ☐ (2) the construction of a collection system on the site; and/or
- ☐ (3) other *(describe)*: _____

2. (Must be completed if 1.b above is checked)
- ☐ a. The sewer system improvement is in conformance with a County approved sewer comprehensive plan,

OR ☐ b. The sewer system improvement will require a sewer comprehensive plan amendment.

3. ☒ a. The proposed project is within the corporate limits of the District, or has been granted Boundary Review Board approval for extension of service outside the District,

OR ☐ b. Annexation or BRB approval will be necessary to provide service.

4. Service is subject to the following:
   a. District Connection Charges due prior to connection:

   GFC: $_____ SFC: $_____ UNIT: $_____ TOTAL: $ _____
   (Subject to Change on January 1st)

   King County/METRO Capacity Charge: Currently, $1090/residential equivalent, will be billed directly by King County after connection to the sewer system. (Subject to change by King Co/Metro without notice.)

   b. Easements: ☐ Required ☒ May be Required
   c. Other: _____
   Charges to be determined

I hereby certify that the above sewer agency information is true. This certification shall be valid for one year from the date of signature.

Diana [signature] | Asst. Mngr. | 7/21/00
By | Title | Date

D03-128

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LOC 03-128

DEPARTMENT OF LABOR AND INDUSTRIES

REGISTERED AS PROVIDED BY LAW AS
CONST CONT GENERAL

	REGIST. #	EXP. DATE
CC01	SABEYCI033KM	01/06/2005
EFFECTIVE DATE		05/14/1997

SABEY CONSTRUCTION INC
12201 TUKWILA INT'L BLVD
4TH FLOOR
SEATTLE WA 98168-5121

F625-052-000 (8/97)

Detach And Display Certificate

REGISTERED AS PROVIDED BY LAW AS
CONST CONT GENERAL

	REGIST. #	EXP. DATE
CC01	SABEYCI033KM	01/06/2005
EFFECTIVE DATE		05/14/1997

SABEY CONSTRUCTION INC
12201 TUKWILA INT'L BLVD
4TH FLOOR
SEATTLE WA 98168-5121

Signature _____
Issued by DEPARTMENT OF LABOR AND INDUSTRIES

Please Remove And Sign Identification Card Before Placing In Billfold

F625-052-000 (8/97)

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DEPARTMENT OF HOMELAND SECURITY
SEATTLE DISTRICT OFFICE

SURFACE WATER TECHNICAL INFORMATION REPORT

Prepared for:

SABEY CORPORATION
12201 TUKWILA INTERNATIONAL BLVD, 4TH FLOOR
SEATTLE, WASHINGTON 98168
(206)-281-8700

EXPIRES 10/14/

RECEIVED
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CORRECTION
LTR# 1

Prepared by:

DAVID EVANS AND ASSOCIATES, INC.
1620 W. Marine View Drive
Everett, WA 98201
425-259-4099

DASC0000-0021

DAVID EVANS AND ASSOCIATES INC.

Revised on:
June 3, 2003

D03-128

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SECTION 1
PROJECT OVERVIEW

An office building for the Immigration and Naturalization Service, a parking garage, uncovered parking, and two access driveways are proposed. Detention and water quality standards will be met for stormwater runoff, with the provision of a wet pond and wet vault designed in accordance with current King County requirements as found in the 1998 King County Surface Water Design Manual (KCSWDM).

EXISTING DRAINAGE SYSTEM AND PROBLEMS

The site lies along the eastern margin of Highway 99, west of Riverton Creek and south of the Metro Maintenance Facility. A portion of the site is currently used as a temporary parking and trailer space, with the remaining area forested with conifers and mixed brush. Moderate slopes are located along much of the area to be developed. Soils are classified as Alderwood series.

The site lies within the Fostoria drainage basin. There are no significant drainage features within the proposed development area. The west tributary of Riverton Creek is located at the base of the proposed development. The creek is a Class 2 stream as identified by the KC Sensitive Areas Folio. Drainage from a portion of Highway 99 discharges through the site, and into Riverton Creek. The lower reach of Riverton Creek is near enough to the Duwamish River to experience tidal influence.

PROPOSED DRAINAGE SYSTEM

The construction of a multi-story office building is proposed. Detention facilities will be designed in accordance with the 1998 King County Surface Water Design Manual. Level 1 flow control will mitigate for increased runoff rates resulting from site development. Water quality will be provided for all pollution generating pervious and impervious surfaces. The proposed drainage system has been designed to meet the requirements set forth in the King County 1998 Surface Water Design Manual, adopted by the City of Tukwila.

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Figure 1 - Technical Information Report Worksheet

King County Department of Development and Environmental Services
TECHNICAL INFORMATION REPORT (TIR) WORKSHEET

Part 1 PROJECT OWNER AND PROJECT ENGINEER

Project Owner

Sabey Corporation

Address

12201 Tukwila International Blvd.

Phone (206)-281-8700

Project Engineer Errol Garr

Company David Evans and Associates

Address/Phone 1620 W Marine View Dr.
Everett, WA (425)-259-4099

Part 2 PROJECT LOCATION AND DESCRIPTION

Project Name INS Building Seattle District

Location

Township 23N

Range 4E

Section Portions of 9 and 10

Part 3 TYPE OF PERMIT APPLICATION

- ☐ Subdivision
- ☐ Short Subdivision
- ☐ Grading
- ☒ Commercial
- ☒ Other Utility and R/W use Permits

Part 4 OTHER REVIEWS AND PERMITS

- ☐ DFW HPA
- ☐ COE 404
- ☐ DOE Dam Safety
- ☐ FEMA Floodplain
- ☐ COE Wetlands
- ☐ Shoreline Management
- ☒ Rockery
- ☒ Structural Vaults
- ☐ Other

Part 5 SITE COMMUNITY AND DRAINAGE BASIN

Community
Riverton Creek – City of Tukwila

Drainage Basin
Riverton Creek Drainage Basin

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Part 6 SITE CHARACTERISTICS

- ☐ River _____
- ☒ Stream RIVERTON CRK
- ☐ Critical Stream Reach
- ☐ Depressions/Swales
- ☐ Lake _____
- ☐ Steep Slopes _____
- ☐ Floodplain _____
- ☒ Wetlands _____
- ☐ Seeps/Springs
- ☐ High Groundwater Table
- ☐ Groundwater Recharge
- ☐ Other _____

Part 7 SOILS

Soil Type	Slopes	Erosion Potential	Erosive Velocities
ALDERWOOD GSL	6-15%	Slight-Moderate	2.5fps

☐ Additional Sheets Attached

Part 8 DEVELOPMENT LIMITATIONS

	REFERENCE	LIMITATION/SITE CONSTRAINT
☐	Ch. 4 – Downstream Analysis	None Identified
☐		
☐		
☐		
☐		
☐		

☐ Additional Sheets Attached

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SCANNED

Part 9 ESC REQUIREMENTS

MINIMUM ESC REQUIREMENTS DURING CONSTRUCTION	MINIMUM ESC REQUIREMENTS AFTER CONSTRUCTION
[X] Sedimentation Facilities	[X] Stabilize Exposed Surface
[X] Stabilized Construction Entrance	[X] Remove and Restore Temporary ESC Facilities
[X] Perimeter Runoff Control	[X] Clean and Remove All Silt and Debris
[ ] Clearing and Grading Restrictions	[X] Ensure Operation of Permanent Facilities
[X] Cover Practices	[ ] Flag Limits of SAO and open space preservation areas
[ ] Construction Sequence	[ ] Other
[ ] Other	

Part 10 SURFACE WATER SYSTEM

[ ] Grass Lined Channel	[ ] Tank	[ ] Infiltration	Method of Analysis
[ ] Pipe System	[X] Vault	[ ] Depression	KCRTS
[ ] Open Channel	[ ] Energy Dissipater	[ ] Flow Dispersal	Compensation/Mitigation of Eliminated Site Storage
[ ] Dry Pond	[ ] Wetland	[ ] Waiver	_____
[X] Wet Pond	[ ] Stream	[ ] Regional Detention	

Brief Description of System Operation: Closed pipe conveyance system, with a wet vault and wet pond to meet detention requirements with dead storage to provide water quality treatment

Facility Related Site Limitations

Reference	Facility	Limitation

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Part 11 STRUCTURAL ANALYSIS	Part 12 EASEMENTS/TRACTS
☒ Cast in Place Vault	☒ Drainage Easement
☒ Retaining Wall	☐ Access Easement
☒ Rockery > 4' High	☐ Native Growth Protection Easement
☐ Structural on Steep Slope	☐ Tract
☐ Other	☐ Other

Part 13 SIGNATURE OF PROFESSIONAL ENGINEER

I or a civil engineer under my supervision have visited the site. Actual site conditions as observed were incorporated into this worksheet and the attachments. To the best of my knowledge the information provided here is accurate.

Errol F. Hare 5-29-03

Signed/Date

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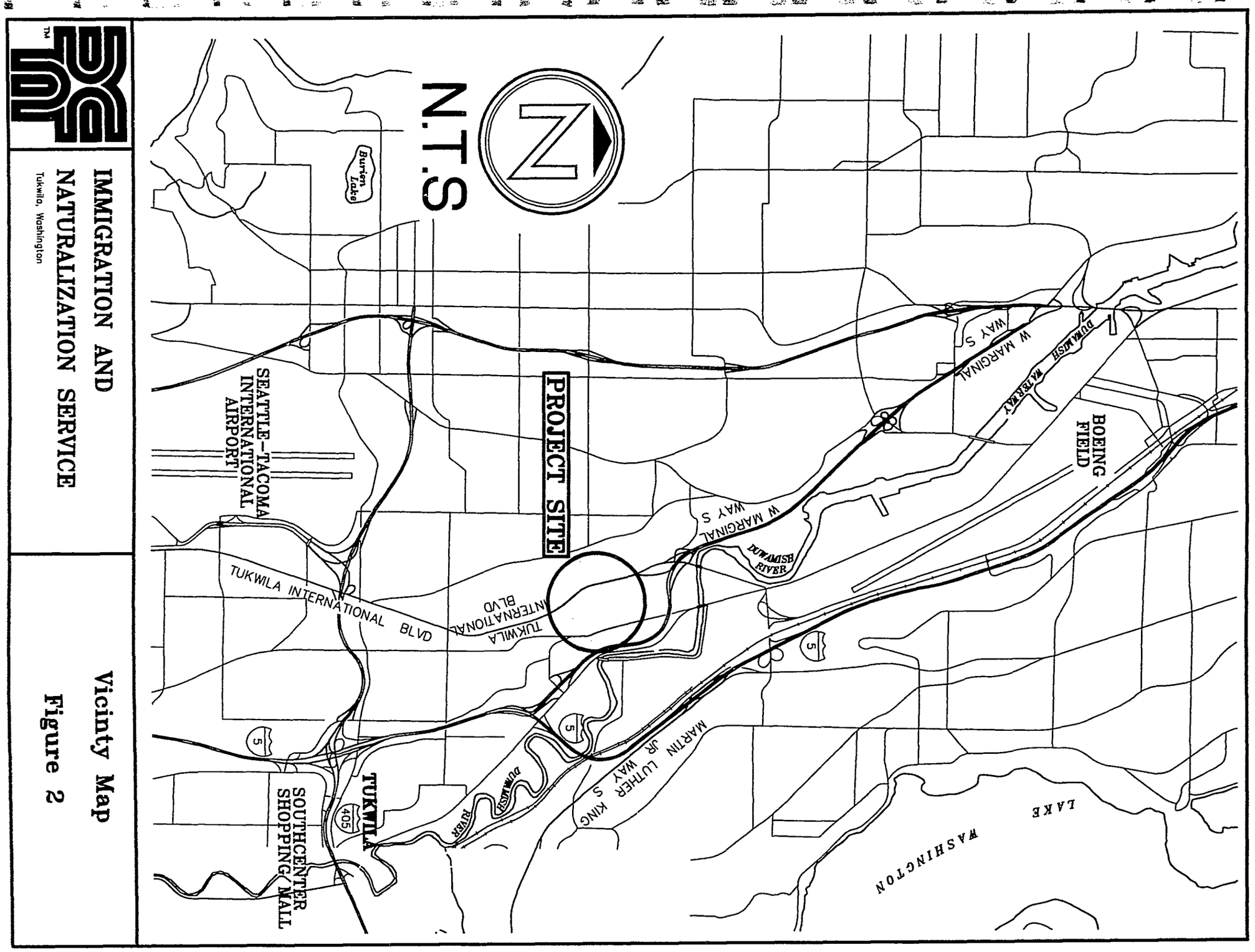

IMMIGRATION AND NATURALIZATION SERVICE

Tukwila, Washington

Vicinity Map

Figure 2

88 1077

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SECTION 2
CONDITIONS AND REQUIREMENTS SUMMARY

This section will address the requirements set forth by the King County Surface Water Management Design Manual Core and Special Requirements listed in Chapter 1.

King County Surface Water Management Design Manual
Core Requirements

1. Discharge at the natural location (1.2.1): The project is tributary to Riverton Creek and generally sheet flows down to the creek in its existing condition. Detention discharge points will be at the edge of the southern wetland complex for the wet pond, and north of the recently completed stream enhancement project for the wet vault.

2. Off-site Analysis (1.2.2): Upstream basins have been identified. Runoff from upstream and tributary flows will continue to discharge to Riverton Creek. A downstream analysis has been prepared and include in Section 3.

3. Flow Control (1.2.3): Detention will be provided for the development through the construction of a wetpond for the southern basin, and a wet vault for the northern basin. The 1998 KCSWDM Level 1 Flow Control Standard will be met.

4. Conveyance System (1.2.4): Closed pipe system used to convey on-site and off-site runoff will be designed to carry the 100-year event flow with no overtopping.

5. Erosion/Sedimentation Control Plan (1.2.5): Erosion control measures will be designed in accordance with King County and City of Tukwila requirements.

6. Maintenance and Operations (1.2.6): A Maintenance and Operations manual has been provided.

7. Financial Guarantees and Liability (1.2.7): Bonds will be provided in accordance with the City of Tukwila requirements.

8. Water Quality (1.2.8): Water quality will be provided by the wet pond and wet vault. The WQ components of the ponds will be designed in accordance with 1998 KCSWDM Basic Wet Pond/Vault BMP requirements.

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King County Surface Water Management Design Manual
Special Requirements

1. Other Adopted Area Specific Requirements (1.3.1): There does not exist any area-specific requirements at this time.

2. Floodplain/Floodway Delineation (1.3.2): The project is not located within any FEMA designated floodplain.

3. Flood Protection Facilities (1.3.3): There are no Class 1 or 2 two streams adjacent to the site that have an existing flood protection facility, nor is the construction of a flood protection facility proposed.

4. Source Control (1.3.4): The proposed project will provide water quality source controls applicable to the proposed project in accordance with the King County Stormwater Pollution Control Manual and City of Tukwila Requirements.

5. Oil Control (1.3.5): Based on the criteria listed in Section 1.3.5, the proposed project does not meet the thresholds that require oil controls. The site will not be subject to 100 ADT per 1,000 square feet of gross building area.

Sensitive Areas Ordinance Requirements

Wetlands – Several on-site wetlands have been identified and delineated in the critical areas study.

Streams - The project is tributary to Riverton Creek and the Duwamish River.

Seismic Hazard Areas - No seismic hazard areas have been identified within or adjacent to the proposed site.

Coal Mine Hazard Areas - The project area is not identified as a CoalMine Hazard area.

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DOCUMENT IMAGING

File: D03-0128

35mm Drawing #1-2

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SECTION 3
OFF-SITE ANALYSIS

This section identifies the tributary basin areas upstream of the project site, and evaluates upstream and downstream drainage system problems. The intent of this section is to demonstrate the proposed project will neither aggravate existing problems nor create new drainage problems.

STUDY AREA DEFINITION

The project site is located within the Fostoria Drainage Basin, which is tributary to the Duwamish River. The project lies within the Riverton Creek subbasin as defined by the Riverton Creek Stormwater Quality Management Plan

The boundary areas for those upstream basins tributary to the project site were delineated in two reports City of Tukwila Surface Water Mangement Plan (April 1993), Riverton Creek Stormwater Management Plan (November 1997), *USGS 1:24,000 Quadrangle Topographic Maps*, and were verified in the field .

In general, runoff from land west of the site drains down to Riverton Creek at three separate locations.

UPSTREAM ANALYSIS

The Riverton Creek basin is approximately 434 acres in size. The proposed development is tributary to the west reach, which is approximately 226 acres in size at the point where it enters the Metro bus facility. The creek enters the site along a concrete stair-step structure and flows through the site in an engineered channel, passing through several culverts before exiting the site on the north side through a 42" concrete culvert. The creek will continue to bypass the new development undisturbed. All other upstream flows will be bypassed, including any runoff from SR99.

LEVEL 1 DOWNSTREAM ANALYSIS

The following downstream analysis was prepared from field observations taken on September 5, 2000 at 2 p.m. Weather conditions were dry and overcast.

The proposed area of development is tributary to Riverton Creek, which crosses the base of the site from south to north. The southernmost detention pond will discharge at a wetland edge before entering Riverton Creek. The creek flows to the north in a channel and then travels underground for 300LF in a series of 30" diameter pipes. Approximately 1160LF downstream, from the southern wet pond, the creek daylights into a channel and passes through two recently installed over-sized "fish-passage" culverts.

The northernmost pond will discharge at a small wetland and runoff will immediately enter a recently installed 24" diameter bypass line. The bypass line increases in diameter to 30" and 36" before discharging to Riverton Creek at the southern edge of the Metro Maintenance facility. This point is the confluence of the discharge from both ponds.

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At this point, discharge enters a 42" culvert with headwall, wingwalls and a debris rack. This culvert directs the creek to the northeast through the Metro Maintenance Facility for approximately 150 feet. At this point the creek daylights into an open-topped concrete box. This fenced box culvert is approximately 8 feet wide with 15 feet of depth. The creek flows back to the north in the box culvert for approximately 150 feet, whereupon it enters a 42" concrete culvert and is piped north for approximately 270 feet, exiting the Metro facility and daylighting into the ditch on the south side of SR 599. The creek passes under SR 599 in twin 48" culverts and enters the ditch on the north side of SR 599, discharging into a large silt-bottomed pool. This ditch is located on the south side of the Gateway Corporate Center North and follows the center along to the west. The ditch widens into a deep ravine with a tall rockery on the north side. The creek is bordered here by the SR 599-SR 99 on-ramp and the Gateway Corporate Center North. The creek discharges into the Duwamish River at the northwest corner of the Corporate Center passing through the levy in twin 48" submerged CMP culverts. There was no visible indication of erosion or scour along the downstream route. This downstream system appears adequate to convey the detained runoff from the proposed development.

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File: D03-0128

Drawing #3

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SECTION 4
FLOW CONTROL & WATER QUALITY FACILITY ANALYSIS AND DESIGN

SITE HYDROLOGY (PARTS A & B)

Part A - Existing Site Hydrology

The existing site hydrology is undeveloped and mostly cleared. There exists several stands of conifers and alder, but the bulk of the site is brush and blackberries. The site is sloped to the east and drains down to the existing parking area and Riverton Creek. A structure (to be demolished) and associated parking are located on the southern portion of the property, near the State Right-of-way. The site is crossed by several drainage features. Riverton Creek enters the property along the southern boundary and passed though an artificial water feature before entering the defined channel that follows the existing buildings and parking to the north. A Type 2 watercourse with a 35-foot buffer drains west to east across the property with drainage from the west side of State Route 99. Additionally, a small ditch running northward along the State Right-of-way enters the property and will be picked up and routed down to the creek in a storm drainage bypass line.

Part B - Developed Site Hydrology

The new drainage system will collect surface runoff in catch basins and carry the water via underground pipes to the proposed detention/water quality facilities. The property will be divided into two basins. The building, access road , and parking structure will be conveyed to the north to the proposed detention vault, to be located underneath the parking structure. The lowest portion of the access drive will not be routed to the detention vault due to grade constraints. It will be modelled as a bypass area using a downstream point of compliance analysis (see bypass area in Tabel 4.1 below).

The parking areas surrounding the office building will be collected and routed to a wet pond located near S. 126th Street at the southern edge of the site. The section of frontage on S. 126th Street and 34th Avenue S. that is to be improved will also be collected and routed to the detention pond for water quality and quantity treatment. 1.07 acres of offsite land is tributary to 34th Avenue and will be routed through the pond. Two single-family residences and gravel driveways exist on this property. The offsite area will be modelled as 0.14 acres of impervious and 0.93 acres of pervious till forest in both the pre- and post-developed conditions.

The north and south drainage basins have been delineated in Figures 6 and 7 respectively. Figure 6 can be found in a pocket flap in the back of this report. The areas are tabulated and listed in Tables 4.1 and 4.2 below.

The detention/water quality facilities have been designed in accordance with the 1998 KCSWDM.

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Table 4.1 – North Basin Area Tabulations

EXISTING BASIN		DEVELOPED BASIN	
Total Subbasin Area (ac)	6.80	Total Subbasin Area (ac)	6.80
Onsite Impervious Area (ac)	0.00	Onsite Impervious Area (ac)	5.35
Onsite Pervious Area (ac) – Till Pasture	6.80	Onsite Pervious Area (ac) – Till Grass	0.60
		Total Bypass Area (ac)	0.85
		Bypass Impervious Area (ac)	0.56
		Bypass Pervious Area (ac) – Till Grass	0.29

Table 4.2 – South Basin Area Tabulations

EXISTING BASIN		DEVELOPED BASIN	
Total Subbasin Area (ac)	4.63	Total Subbasin Area (ac)	4.63
Onsite Impervious Area (ac)	0.00	Onsite Impervious Area (ac)	2.53
Onsite Pervious Area (ac) – Till Pasture	3.34	Onsite Pervious Area (ac) – Till Grass	0.81
R/W Impervious Area (ac)	0.10	R/W Impervious Area (ac)	0.22
R/W Pervious Area (ac) – Till Pasture	0.12	R/W Pervious Area (ac) – Till Grass	0.00
Offsite Impervious Area (ac)	0.14	Offsite Impervious Area (ac)	0.14
Offsite Pervious Area (ac) – Till Forest	0.93	Offsite Pervious Area (ac) – Till Forest	0.93

Part C - Performance Standards

The project site has been identified as a Level 1 Flow Control Area by the City of Tukwila Department of Public Works. According to Table 1.2.3.A of the KCSWM, this requires the 2-year and 10-year peak discharge rates be matched for existing and developed conditions. Existing conditions are those that currently exist at the site.

Part D - Flow Control System

Flow control will be achieved using a wet vault and riser with orifices to match developed 2-yr and 10-yr peak rates to existing peak flow rates as modeled using KCRTS. The flow rates for the north and south basin are summarized in Tables 4.3 and 4.4 below.

Table 4.3 – North Basin On-site Peak Flows From KCRTS

EXISTING FLOW (CFS)			DEVELOPED FLOW (CFS)		
2-YR	10-YR	100-YR	2-YR	10-YR	100-YR
0.244	0.437	0.821	1.35	1.63	2.66
		Vault Design	0.11	0.32	2.26

Table 4.4 – South Basin On-site Peak Flows From KCRTS

EXISTING FLOW (CFS)			DEVELOPED FLOW (CFS)		
2-YR	10-YR	100-YR	2-YR	10-YR	100-YR
0.188	0.326	0.598	0.810	0.962	1.61
		Pond Design	0.188	0.326	1.10

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Water Quality

The project requires Basic Water Quality Treatment. The site has not been identified by the City as one that requires special water quality requirements.

The dead storage components of the wet vault and wet pond will provide basic water quality treatment for all new and replaced impervious surfacing. The north basin water quality volume is 25,412 cf; 26, 391 cf are provided. The south basin water quality volume is 15,539 cf; 17,236 cf are provided (See Appendix B for calculations).

Water quality will be provided for the bypass portion of the proposed access road in the north basin by an existing biofiltration swale. This swale has a 3-foot bottom width, a length of 183LF, and a longitudinal slope of 1.55%. The section of the swale is approximately trapezoidal with 3:1 to 2:1 side slopes. Any attempts to modify the section would require removal of the 8 existing pine trees located on the edge of the swale. The following calculations demonstrate that the existing swale can treat the proposed bypass area without any modifications:

Step 1: Calculate design flows: Qwq = 2-yr peak = 0.162 (see attached Bypass.pks time series file).

Step 2: Calculate swale bottom width: 3 feet

Step 3: Determine flow velocity: $V_{wq} = \frac{Q_{wq}}{A_{wq}}$ = 0.162 / (3*0.17 + 2*0.17^2) = 0.29 fps w/ y = 2inches and 2:1 side slopes. 0.29 fps < 1 fps O.K.

Step 4: Calculate swale length: $L=540V_{wq}$ = 540*0.29 = 154 LF, 183 LF is provided.

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Figure 6 – North Basin Map

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File: D03-0128

35mm Drawing

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SECTION 5
CONVEYANCE SYSTEM ANALYSIS AND DESIGN

In accordance with King County Core Requirement #4, pipe systems and culverts shall be designed to convey and contain at least the peak runoff rate for the 25-year design storm. The attached spreadsheet demonstrates that the proposed design can convey the 100-year storm with no over-topping. The south pond will discharge to a level spreader/dispersion trench. This trench has been sized in accordance with thr 1998 KCSWDM. The south pond 100-year peak discharge is 1.10 cfs. 100 LF of trench will be provided. The basin areas for the conveyance calculations can be found in Figures 6a and 7a. Figure 7a can be found in a pocket flap in the back of this report.

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SECTION 6
SPECIAL REPORTS AND STUDIES

Geotechnical/Soils – A geotechnical report has been prepared and submitted.

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SECTION 7
OTHER PERMITS

Permits required for this project include:

- **Clearing and Grading Permit,** City of Tukwila
- **Utility Permits**
- **R/W Use Permit,** Washington State Department of Transportation

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SECTION 8
TESC ANALYSIS AND DESIGN

Erosion control measures will include silt fences, straw check dams, catch basin inlet protection and ground cover practices. Silt fences will be placed at the downstream edges of all disturbed areas. The plans will include details and notes for the use and maintenance of straw check dams, catch basin protection and ground cover practices.

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SECTION 9
MAINTENANCE AND OPERATIONS MANUAL

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APPENDIX A
MAINTENANCE STANDARDS FOR PRIVATELY MAINTAINED DRAINAGE FACILITIES

NO. 1 - DETENTION PONDS

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Trash & Debris	Any trash and debris which exceed 1 cubic foot per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one standard size office garbage can). In general, there should be no visual evidence of dumping.	Trash and debris cleared from site.
	Poisonous Vegetation	Any poisonous or nuisance vegetation which may constitute a hazard to County personnel or the public.	No danger of poisonous vegetation where County personnel or the public might normally be. (Coordination with Seattle-King County Health Department)
	Pollution	Oil, gasoline, or other contaminants of one gallon or more or any amount found that could: 1) cause damage to plant, animal, or marine life; 2) constitute a fire hazard; or 3) be flushed downstream during rain storms.	No contaminants present other than a surface film. (Coordination with Seattle/King County Health Department)
	Unmowed Grass/ Ground Cover	If facility is located in private residential area, mowing is needed when grass exceeds 18 inches in height. In other areas, the general policy is to make the pond site match adjacent ground cover and terrain as long as there is no interference with the function of the facility.	When mowing is needed, grass/ground cover should be mowed to 2 inches in height. Mowing of selected higher use areas rather than the entire slope may be acceptable for some situations.
	Rodent Holes	Any evidence of rodent holes if facility is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes.	Rodents destroyed and dam or berm repaired. (Coordination with Seattle/King County Health Department)
	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site.
	Tree Growth	Tree growth does not allow maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements). If trees are not interfering with access, leave trees alone.	Trees do not hinder maintenance activities. Selectively cultivate trees such as alders for firewood.
Side Slopes of Pond	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
Storage Area	Sediment	Accumulated sediment that exceeds 10% of the designed pond depth.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
Pond Dikes	Settlements	Any part of dike which has settled 4 inches lower than the design elevation.	Dike should be built back to the design elevation.
Emergency Overflow/Spillway	Rock Missing	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil at the top of out flow path of spillway. Rip-rap on inside slopes need not be replaced.	Replace rocks to design standards.

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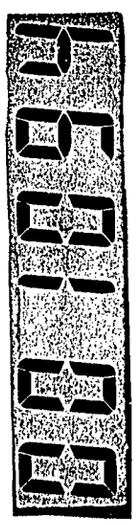

NO. 3 - CLOSED DETENTION SYSTEMS (PIPES/TANKS)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Storage Area	Plugged Air Vents	One-half of the cross section of a vent is blocked at any point with debris and sediment	Vents free of debris and sediment
	Debris and Sediment	Accumulated sediment depth exceeds 10% of the diameter of the storage area for ½ length of storage vault or any point depth exceeds 15% of diameter. Example: 72-inch storage tank would require cleaning when sediment reaches depth of 7 inches for more than ½ length of tank.	All sediment and debris removed from storage area.
	Joints Between Tank/Pipe Section	Any crack allowing material to be transported into facility	All joint between tank /pipe sections are sealed
	Tank Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10% of it's design shape	Tank/ pipe repaired or replaced to design.
Manhole	Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than ½ inch of thread (may not apply to self-locking lids.)	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying 80lbs of lift. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
	Ladder Rungs Unsafe	King County Safety Office and/or maintenance person judges that ladder is unsafe due to missing rungs, misalignment, rust, or cracks.	Ladder meets design standards allows maintenance person safe access.
Catch Basins		See "Catch Basins" Standards No. 5	See "Catch Basins" Standards No. 5

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NO. 4 - CONTROL STRUCTURE/FLOW RESTRICTOR

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris (Includes Sediment)	Distance between debris build-up and bottom of orifice plate is less than 1-1/2 feet.	All trash and debris removed.
	Structural Damage	Structure is not securely attached to manhole wall and outlet pipe structure should support at least 1,000 lbs of up or down pressure.	Structure securely attached to wall and outlet pipe.
		Structure is not in upright position (allow up to 10% from plumb).	Structure in correct position.
		Connections to outlet pipe are not watertight and show signs of rust.	Connections to outlet pipe are water tight; structure repaired or replaced and works as designed.
		Any holes--other than designed holes--in the structure.	Structure has no holes other than designed holes.
Cleanout Gate	Damaged or Missing	Cleanout gate is not watertight or is missing.	Gate is watertight and works as designed.
		Gate cannot be moved up and down by one maintenance person.	Gate moves up and down easily and is watertight.
		Chain leading to gate is missing or damaged.	Chain is in place and works as designed.
		Gate is rusted over 50% of its surface area.	Gate is repaired or replaced to meet design standards..
Orifice Plate	Damaged or Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as designed.
	Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
Overflow Pipe	Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.
Manhole		See "Closed Detention Systems" Standards No. 3	See "Closed Detention Systems' Standards No. 3
Catch Basin		See "Catch Basins" Standards No. 5	See 'Catch Basins" Standards No. 5

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NO. 5 - CATCH BASINS

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris (Includes Sediment)	Trash or debris of more than 1/2 cubic foot which is located immediately in front of the catch basin opening or is blocking capacity of the basin by more than 10%	No Trash or debris located immediately in front of catch basin opening.
		Trash or debris (in the basin) that exceeds 1/3 the depth from the bottom of basin to invert the lowest pipe into or out of the basin.	No trash or debris in the catch basin.
		Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height.	Inlet and outlet pipes free of trash or debris.
		Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation present within the catch basin.
		Deposits of garbage exceeding 1 cubic foot in volume	No condition present which would attract or support the breeding of insects or rodents.
	Structure Damage to Frame and/or Top Slab	Corner of frame extends more than 3/4 inch past curb face into the street (If applicable).	Frame is even with curb.
		Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch (intent is to make sure all material is running into basin).	Top slab is free of holes and cracks.
		Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab.	Frame is sitting flush on top slab.
	Cracks in Basin Walls/ Bottom	Cracks wider than 1/2 inch and longer than 3 feet, any evidence of soil particles entering catch basin through cracks, or maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.
		Cracks wider than 1/2 inch and longer than 1 foot at the joint of any inlet/ outlet pipe or any evidence of soil particles entering catch basin through cracks.	No cracks more than 1/4 inch wide at the joint of inlet/outlet pipe.
	Sediment/ Misalignment	Basin has settled more than 1 inch or has rotated more than 2 inches out of alignment.	Basin replaced or repaired to design standards.

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NO. 5 - CATCH BASINS (*CONTINUED*)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
	Fire Hazard	Presence of chemicals such as natural gas, oil and gasoline.	No flammable chemicals present.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening.	No vegetation blocking opening to basin.
		Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation or root growth present.
	Pollution	Nonflammable chemicals of more than 1/2 cubic foot per three feet of basin length.	No pollution present other than surface film.
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Catch basin cover is closed
	Locking Mechanism Not Working	Mechanism cannot be opened by on maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying 80 lbs. of lift; intent is keep cover from sealing off access to maintenance.	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (If Applicable)		Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.

NO. 6 DEBRIS BARRIERS (E.G., TRASH RACKS)

Maintenance Components	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed.
General	Trash and Debris	Trash or debris that is plugging more than 20% of the openings in the barrier.	Barrier clear to receive capacity flow.
Metal	Damaged/ Missing Bars.	Bars are bent out of shape more than 3 inches.	Bars in place with no bends more than 3/4 inch.
		Bars are missing or entire barrier missing.	Bars in place according to design.
		Bars are loose and rust is causing 50% deterioration to any part of barrier.	Repair or replace barrier to design standards.

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NO. 7 - ENERGY DISSIPATERS

Maintenance Components	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance is Performed.
External: Rock Pad	Missing or Moved Rock	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil.	Replace rocks to design standards.
Dispersion Trench	Pipe Plugged with Sediment	Accumulated sediment that exceeds 20% of the design depth.	Pipe cleaned/ flushed so that it matches design.
	Not Discharging Water Properly	Visual evidence of water discharging at concentrated points along trench (normal condition is a "sheet flow" of water along trench). Intent is to prevent erosion damage.	Trench must be redesigned or rebuilt to standards.
	Perforations Plugged.	Over 1/2 of perforations in pipe are plugged with debris and sediment.	Clean or replace perforated pipe.
	Water Flows Out Top of "Distributor" Catch Basin.	Maintenance person observes water flowing out during any storm less than the design storm or its causing or appears likely to cause damage.	Facility must be rebuilt or redesigned to standards.
	Receiving Area Over-Saturated	Water in receiving area is causing or has potential of causing landslide problems.	No danger of landslides.
Internal: Manhole/ Chamber	Worn or Damaged Post. Baffles, Side of Chamber	Structure dissipating flow deteriorates to 1/2 or original size or any concentrated worn spot exceeding one square foot which would make structure unsound.	Replace structure to design standards.
	Other Defects	See "Catch Basins" Standard No. 5	See "Catch Basins" Standard No. 5

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NO. 8 - FENCING

Maintenance Components	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Missing or Broken Parts	Any defect in the fence that permits easy entry to a facility.	Parts in place to provide adequate security.
	Erosion	Erosion more than 4 inches high and 12-18 inches wide permitting an opening under a fence.	No opening under the fence that exceeds 4 inches in height.
Wire Fences	Damaged Parts	Post out of plumb more than 6 inches.	Post plumb to within 1-1/2 inches.
		Top rails bent more than 6 inches.	Top rail free of bends greater than 1 inch.
		Any part of fence (including post, top rails, and fabric) more than 1 foot out of design alignment.	Fence is aligned and meets design standards.
		Missing or loose tension wire.	Tension wire in place and holding fabric.
		Missing or loose barbed wire that is sagging more than 2-1/2 inches between posts.	Barbed wire in place with less than 3/4 inch sag between post.
		Extension arm missing, broken, or bent out of shape more than 1 1/2 inches.	Extension arm in place with no bends larger than 3/4 inch.
	Deteriorated Paint or Protective Coating	Part or parts that have a rusting or scaling condition that has affected structural adequacy.	Structurally adequate posts or parts with a uniform protective coating.
	Openings in Fabric	Openings in fabric are such that an 8-inch-diameter ball could fit through.	No openings in fabric.

NO. 9 - GATES

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Damaged or Missing Members	Missing gate or locking devices.	Gates and Locking devices in place.
		Broken or missing hinges such that gate cannot be easily opened and closed by a maintenance person.	Hinges intact and lubed. Gate is working freely.
		Gate is out of plumb more than 6 inches and more than 1 foot out of design alignment.	Gate is aligned and vertical.
		Missing stretcher bar, stretcher bands, and ties.	Stretcher bar, bands and ties in place.
	Openings in Fabric	See "Fencing" Standard No. 8	See "Fencing" Standard No. 8

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NO. 10 - CONVEYANCE SYSTEMS (PIPES & DITCHES)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Pipes	Sediment & Debris	Accumulated sediment that exceeds 20% of the diameter of the pipe.	Pipe cleaned of all sediment and debris.
	Vegetation	Vegetation that reduces free movement of water through pipes.	All vegetation removed so water flows freely through pipes.
	Damaged	Protective coating is damaged; rust is causing more than 50% deterioration to any part of pipe.	Pipe repaired or replaced.
		Any dent that decreases the cross section area of pipe by more than 20%.	Pipe repaired or replaced.
Open Ditches	Trash & Debris	Trash and debris exceeds 1 cubic foot per 1,000 square feet of ditch and slopes.	Trash and debris cleared from ditches.
	Sediment	Accumulated sediment that exceeds 20 % of the design depth.	Ditch cleaned/ flushed of all sediment and debris so that it matches design.
	Vegetation	Vegetation that reduces free movement of water through ditches.	Water flows freely through ditches.
	Erosion Damage to Slopes	See "Ponds" Standard No. 1	See "Ponds" Standard No. 1
	Rock Lining Out of Place or Missing (If Applicable).	Maintenance person can see native soil beneath the rock lining.	Replace rocks to design standards.
Catch Basins		See "Catch Basins: Standard No. 5	See "Catch Basins" Standard No. 5
Debris Barriers (e.g., Trash Rack)		See "Debris Barriers" Standard No.6	See "Debris Barriers" Standard No. 6

NO. 11 - GROUNDS (LANDSCAPING)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Weeds (Nonpoisonous)	Weeds growing in more than 20% of the landscaped area (trees and shrubs only).	Weeds present in less than 5% of the landscaped area.
	Safety Hazard	Any presence of poison ivy or other poisonous vegetation.	No poisonous vegetation present in landscaped area.
	Trash or Litter	Paper, cans, bottles, totaling more than 1 cubic foot within a landscaped area (trees and shrubs only) of 1,000 square feet.	Area clear of litter.
Trees and Shrubs	Damaged	Limbs or parts of trees or shrubs that are split or broken which affect more than 25% of the total foliage of the tree or shrub.	Trees and shrubs with less than 5% of total foliage with split or broken limbs.
		Trees or shrubs that have been blown down or knocked over.	Tree or shrub in place free of injury.
		Trees or shrubs which are not adequately supported or are leaning over, causing exposure of the roots.	Tree or shrub in place and adequately supported; remove any dead or diseased trees.

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NO. 12 - ACCESS ROADS/ EASEMENTS

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris	Trash and debris exceeds 1 cubic foot per 1,000 square feet i.e., trash and debris would fill up one standards size garbage can.	Roadway free of debris which could damage tires.
	Blocked Roadway	Debris which could damage vehicle tires (glass or metal).	Roadway free of debris which could damage tires.
		Any obstruction which reduces clearance above road surface to less than 14 feet.	Roadway overhead clear to 14 feet high.
		Any obstruction restricting the access to a 10 to 12 foot width for a distance of more than 12 feet or any point restricting access to less than a 10 foot width.	Obstruction removed to allow at least a 12 foot access.
Road Surface	Settlement, Potholes, Mush Spots, Ruts	When any surface defect exceeds 6 inches in depth and 6 square feet in area. In general, any surface defect which hinders or prevents maintenance access.	Road surface uniformly smooth with no evidence of settlement, potholes, mush spots, or ruts.
	Vegetation in Road Surface	Weeds growing in the road surface that are more than 6 inches tall and less than 6 inches tall and less than 6 inches apart within a 400-square foot area.	Road surface free of weeds taller than 2 inches.
	Modular Grid Pavement	Build-up of sediment mildly contaminated with petroleum hydrocarbons.	Removal of sediment and disposal in keeping with Health Department recommendations for mildly contaminated soils or catch basin sediments.
Shoulders and Ditches	Erosion Damage	Erosion within 1 foot of the roadway more than 8 inches wide and 6 inches deep.	Shoulder free of erosion and matching the surrounding road.
	Weeds and Brush	Weeds and brush exceed 18 inches in height or hinder maintenance access.	Weeds and brush cut to 2 inches in height or cleared in such a way as to allow maintenance access.

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NO. 13- WATER QUALITY FACILITIES

A.) Biofiltration Swale

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Biofiltration swale	Sediment Accumulation on Grass Layer	Sediment depth exceeds 2-inches	No sediment deposits on grass layer of the bio-swale, which would impede filtration of runoff.
	Vegetation	When the grass becomes excessively tall (greater than 10-inches); when nuisance weeds and other vegetation starts to take over.	Vegetation is mowed or nuisance vegetation is eradicated, such that flow not impeded. Grass should be mowed to a height between 4 inches and 9 inches.
	Inlet Outlet Pipe	Inlet/ outlet pipe clogged with sediment and/ or debris.	No clogging or blockage in the inlet and outlet piping.
	Trash and Debris Accumulation	Trash and debris accumulated in the bio-swale.	Trash and debris removed from bioswale.
	Erosion/ Scouring	Where the bio-swale has eroded or scoured the bottom due to flow channelization, or higher flows.	Bioswale should be re-graded and re-seeded to specification, to eliminated channeled flow. Overseeded when bare spots are evident.

NO. 13- WATER QUALITY FACILITIES (*CONTINUED*)

B.) Grasslined Filter Strips

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Filter Strip	Sediment Accumulation on Grass Layer	Sediment depth exceeds 2 inches.	No sediment deposits on grass layer of the filter strip, which would impede filtration runoff.
	Vegetation	When the grass becomes excessively tall (greater than 10-inches); when nuisance weeds and other vegetation starts to take over.	Vegetation is mowed or nuisance vegetation is eradicated, such that flow not impeded. Grass should be mowed to a height between 4 inches and 9 inches.
	Trash and Debris Accumulation	Trash and debris accumulated on the filter strip.	Trash and Debris removed from filter.
	Erosion/ Scouring	Where the filter strip has eroded or scoured due to flow channelization, or higher flows.	Strip should be re-graded and re-seeded specification, to eliminate channeled flow. Overseeded when bare spots are evident.
	V-Notch Pipe Weir	When the V-Notch pipe becomes damaged or clogged with sediment/ debris.	Cleaned and properly functioning weir, such that flows uniformly spread.

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C.) Wetponds

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Wetpond	Vegetation	Vegetation such as grass and weeds need to be mowed when it starts to impede aesthetics of pond. Mowing is generally required when height exceeds 18-inches. Mowed vegetation should be removed from areas where it could enter the pond, either when the pond level rises, or by rainfall runoff.	Vegetation should be mowed to 4 to 5 inches in height. Trees and bushes should be removed where they are interfering with pond maintenance activities.
	Trash and Debris	Accumulation that exceeds 1 CF per 1000-SF of pond area.	Trash and debris removed from pond.
	Inlet/ Outlet Pipe	Inlet/ Outlet pipe clogged with sediment and/ or debris material.	No clogging or blockage in the inlet and outlet piping.
	Sediment Accumulation in Pond Bottom	Sediment accumulations in pond bottom that exceeds the depth of sediment zone plus 6-inches, usually the first cell.	Removal of sediment from pond bottom.
	Oil Sheen on Water	Prevalent and visible oil sheen.	Removal of sediment from pond bottom.
	Erosion	Erosion of the pond's side slopes and/ or scouring of the pond bottom, that exceeds 6-inches, or where continued erosion is prevalent.	Slopes should be stabilized by using proper erosion control measures, and repair methods.
	Settlement of Pond Dike/ Berm	Any part of these components that has settled 4-inches or lower than the design elevation, or inspector determines dike/ berm is unsound.	Dike/ berm is repaired to specifications.
	Rock Window	Rock window is clogged with sediment.	Window is free of sediment and debris.
	Overflow Spillway	Rock is missing and soil is exposed at top of spillway or outside slope.	Replace rocks to specifications.

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NO. 13 - WATER QUALITY FACILITIES (*CONTINUED*)

D.) Wetvaults

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Wetvault	Trash/ Debris Accumulation	Trash and debris accumulated in vault, pipe or inlet/ outlet, (includes floatables and non-floatables).	Trash and debris removed from vault.
	Sediment Accumulation in Vault	Sediment accumulation in vault bottom that exceeds the depth of the sediment zone plus 6-inches.	Removal of sediment from vault.
	Damaged Pipes	Inlet/ outlet piping damaged or broken and in need of repair.	Pipe repaired and/ or replaced.
	Access Cover Damaged/ Not Working	Cover cannot be opened or removed, especially by one person.	Pipe repaired or replaced to proper working specifications.
	Vault Structure Damaged	Vault: Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/ inspection personnel determines that the vault is not structurally sound.	No cracks wider than 1/4-inch at the joint of the inlet/ outlet pipe. Vault is determined to be structurally sound.
	Baffles	Baffles corroding, cracking, warping and/ or showing signs of failure as determined by maintenance/ inspection staff.	Repair or replace baffles to specifications.
	Access Ladder Damage	Ladder is corroded or deteriorated, not functioning properly, missing rungs, has cracks and/ or misaligned.	Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel.

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APPENDIX A – ON-SITE WATER QUANTITY CALCULATIONS

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

```
   KCRTS Program...File Directory:
C:\KC_SWDM\KC_DATA\
[C] CREATE a new Time Series
ST
        0.00        0.00        0.000000  Till Forest
        6.80        0.00        0.000000  Till Pasture
        0.00        0.00        0.000000  Till Grass
        0.00        0.00        0.000000  Outwash Forest
        0.00        0.00        0.000000  Outwash Pasture
        0.00        0.00        0.000000  Outwash Grass
        0.00        0.00        0.000000  Wetland
        0.00        0.00        0.000000  Impervious
Prenorth.tsf
 T
    1.00000
 T
[C] CREATE a new Time Series
ST
        0.00        0.00        0.000000  Till Forest
        0.00        0.00        0.000000  Till Pasture
        0.29        0.00        0.000000  Till Grass
        0.00        0.00        0.000000  Outwash Forest
        0.00        0.00        0.000000  Outwash Pasture
        0.00        0.00        0.000000  Outwash Grass
        0.00        0.00        0.000000  Wetland
        0.56        0.00        0.000000  Impervious
Bypass.tsf
 T
    1.00000
 T
[C] CREATE a new Time Series
ST
        0.00        0.00        0.000000  Till Forest
        0.00        0.00        0.000000  Till Pasture
        0.60        0.00        0.000000  Till Grass
        0.00        0.00        0.000000  Outwash Forest
        0.00        0.00        0.000000  Outwash Pasture
        0.00        0.00        0.000000  Outwash Grass
        0.00        0.00        0.000000  Wetland
        5.35        0.00        0.000000  Impervious
Devnorth.tsf
 T
    1.00000
 T
[T] Enter the Analysis TOOLS Module
[P] Compute PEAKS and Flow Frequencies
devnorth.tsf
Devnorth.pks
```


NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

Recordno.exc
[P] Compute PEAKS and Flow Frequencies
prenorth.tsf
Prenorth.pks
[P] Compute PEAKS and Flow Frequencies
bypass.tsf
Bypass.pks
[R] RETURN to Previous Menu
[F] Size a Retention/Detention FACILITY
Manual Design
Vault.rdf
 5 Route Time Series
 0 Return to Main Menu
[F] Size a Retention/Detention FACILITY
Manual Design
Vault.rdf
 5 Route Time Series
 0 Return to Main Menu
[X] eXit KCRTS Program

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

Prenorth.pks

Flow Frequency Analysis

Time Series File:prenorth.tsf

Project Location:Sea-Tac

---Annual Peak Flow Rates---				Flow Frequency Analysis			
Flow Rate (CFS)	Rank	Time of Peak		Peaks (CFS)	Rank	Return Period	Prob
0.480	2	2/09/01	18:00	0.821	1	100.00	0.99
0.179	7	1/05/02	16:00	0.480	2	25.00	0.96
0.437	3	2/28/03	3:00	0.437	3	10.00	0.90
0.047	8	3/24/04	19:00	0.408	4	5.00	0.80
0.244	6	1/05/05	8:00	0.394	5	3.00	0.66
0.408	4	1/18/06	16:00	0.244	6	2.00	0.50
0.394	5	11/24/06	4:00	0.179	7	1.30	0.23
0.821	1	1/09/08	6:00	0.047	8	1.10	0.09
Computed Peaks				0.708		50.00	0.98

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Devnorth.pks

Flow Frequency Analysis

Time Series File:devnorth.tsf

Project Location:Sea-Tac

---Annual Peak Flow Rates---				-----Flow Frequency Analysis------			
Flow Rate (CFS)	Rank	Time of Peak		- - Peaks - - (CFS)	Rank	Return Period	Prob
1.35	6	2/09/01	2:00	2.66	1	100.00	0.99
0							
1.17	8	1/05/02	16:00	1.96	2	25.00	0.96
0							
1.63	3	12/08/02	18:00	1.63	3	10.00	0.90
0							
1.34	7	8/26/04	2:00	1.60	4	5.00	0.80
0							
1.60	4	10/28/04	16:00	1.44	5	3.00	0.66
7							
1.44	5	1/18/06	16:00	1.35	6	2.00	0.50
0							
1.96	2	10/26/06	0:00	1.34	7	1.30	0.23
1							
2.66	1	1/09/08	6:00	1.17	8	1.10	0.09
1							
Computed Peaks				2.42		50.00	0.98
0							

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

Bypass.pks
Flow Frequency Analysis
Time Series File:bypass.tsf
Project Location:Sea-Tac

---Annual Peak Flow Rates---

Flow Rate (CFS)	Rank	Time of Peak
0.162	6	2/09/01 2:00
0.133	8	1/05/02 16:00
0.194	3	2/27/03 7:00
0.145	7	8/26/04 2:00
0.174	4	10/28/04 16:00
0.172	5	1/18/06 16:00
0.211	2	10/26/06 0:00
0.326	1	1/09/08 6:00

Computed Peaks

-----Flow Frequency Analysis------

Peaks (CFS)	Rank	Return Period	Prob
0.326	1	100.00	0.99
0.211	2	25.00	0.96
0.194	3	10.00	0.90
0.174	4	5.00	0.80
0.172	5	3.00	0.66
0.162	6	2.00	0.50
0.145	7	1.30	0.23
0.133	8	1.10	0.09
0.287		50.00	0.98

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Dsout.pks

Flow Frequency Analysis

Time Series File:dsout.tsf

Project Location:Sea-Tac

---Annual Peak Flow Rates---				Flow Frequency Analysis			
Flow Rate (CFS)	Rank	Time of Peak		Peaks (CFS)	Rank	Return Period	Prob
0.865	2	2/09/01	18:00	2.53	1	100.00	0.99
0.215	8	1/05/02	16:00	0.865	2	25.00	0.96
0.368	4	3/06/03	18:00	0.442	3	10.00	0.90
0.240	6	8/26/04	2:00	0.368	4	5.00	0.80
0.226	7	10/28/04	17:00	0.355	5	3.00	0.66
0.355	5	1/18/06	20:00	0.240	6	2.00	0.50
0.442	3	11/24/06	4:00	0.226	7	1.30	0.23
2.53	1	1/09/08	9:00	0.215	8	1.10	0.09
Computed Peaks				1.97		50.00	0.98

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Retention/Detention Facility

Type of Facility:	Detention Vault	
Facility Length:	126.00	ft
Facility Width:	45.00	ft
Facility Area:	5670.	sq. ft
Effective Storage Depth:	13.25	ft
Stage 0 Elevation:	49.00	ft
Storage Volume:	75128.	cu. ft
Riser Head:	13.25	ft
Riser Diameter:	18.00	inches
Number of orifices:	2	

Orifice #	Height (ft)	Diameter (in)	Full Head Discharge (CFS)	Pipe Diameter (in)
1	0.00	1.25	0.151	
2	8.32	1.76	0.177	4.0

Top Notch Weir: None
Outflow Rating Curve: None

Stage (ft)	Elevation (ft)	Storage (cu. ft)	(ac-ft)	Discharge (cfs)	Percolation (cfs)
0.00	49.00	0.	0.000	0.000	0.00
0.01	49.01	57.	0.001	0.005	0.00
0.03	49.03	170.	0.004	0.007	0.00
0.04	49.04	227.	0.005	0.008	0.00
0.05	49.05	284.	0.007	0.010	0.00
0.07	49.07	397.	0.009	0.011	0.00
0.08	49.08	454.	0.010	0.012	0.00
0.09	49.09	510.	0.012	0.013	0.00
0.10	49.10	567.	0.013	0.014	0.00
0.33	49.33	1871.	0.043	0.024	0.00
0.55	49.55	3119.	0.072	0.032	0.00
0.78	49.78	4423.	0.102	0.037	0.00
1.00	50.00	5670.	0.130	0.042	0.00
1.23	50.23	6974.	0.160	0.047	0.00
1.45	50.45	8222.	0.189	0.051	0.00
1.68	50.68	9526.	0.219	0.055	0.00
1.90	50.90	10773.	0.247	0.058	0.00
2.13	51.13	12077.	0.277	0.062	0.00
2.35	51.35	13324.	0.306	0.065	0.00
2.57	51.57	14572.	0.335	0.068	0.00
2.80	51.80	15876.	0.364	0.071	0.00
3.02	52.02	17123.	0.393	0.074	0.00
3.25	52.25	18428.	0.423	0.076	0.00
3.47	52.47	19675.	0.452	0.079	0.00
3.70	52.70	20979.	0.482	0.081	0.00
3.92	52.92	22226.	0.510	0.084	0.00
4.15	53.15	23531.	0.540	0.086	0.00
4.37	53.37	24778.	0.569	0.089	0.00
4.60	53.60	26082.	0.599	0.091	0.00
4.82	53.82	27329.	0.627	0.093	0.00
5.04	54.04	28577.	0.656	0.095	0.00
5.27	54.27	29881.	0.686	0.097	0.00

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5.49	54.49	31128.	0.715	0.099	0.00
5.72	54.72	32432.	0.745	0.101	0.00
5.94	54.94	33680.	0.773	0.103	0.00
6.17	55.17	34984.	0.803	0.105	0.00
6.39	55.39	36231.	0.832	0.107	0.00
6.62	55.62	37535.	0.862	0.109	0.00
6.84	55.84	38783.	0.890	0.111	0.00
7.07	56.07	40087.	0.920	0.113	0.00
7.29	56.29	41334.	0.949	0.114	0.00
7.52	56.52	42638.	0.979	0.116	0.00
7.74	56.74	43886.	1.007	0.118	0.00
7.96	56.96	45133.	1.036	0.120	0.00
8.19	57.19	46437.	1.066	0.121	0.00
8.32	57.32	47174.	1.083	0.122	0.00
8.34	57.34	47288.	1.086	0.123	0.00
8.36	57.36	47401.	1.088	0.125	0.00
8.38	57.38	47515.	1.091	0.128	0.00
8.39	57.39	47571.	1.092	0.133	0.00
8.41	57.41	47685.	1.095	0.139	0.00
8.43	57.43	47798.	1.097	0.146	0.00
8.45	57.45	47912.	1.100	0.153	0.00
8.47	57.47	48025.	1.103	0.155	0.00
8.69	57.69	49272.	1.131	0.176	0.00
8.92	57.92	50576.	1.161	0.191	0.00
9.14	58.14	51824.	1.190	0.204	0.00
9.36	58.36	53071.	1.218	0.216	0.00
9.59	58.59	54375.	1.248	0.226	0.00
9.81	58.81	55623.	1.277	0.235	0.00
10.04	59.04	56927.	1.307	0.244	0.00
10.26	59.26	58174.	1.335	0.253	0.00
10.49	59.49	59478.	1.365	0.261	0.00
10.71	59.71	60726.	1.394	0.269	0.00
10.94	59.94	62030.	1.424	0.276	0.00
11.16	60.16	63277.	1.453	0.283	0.00
11.39	60.39	64581.	1.483	0.290	0.00
11.61	60.61	65829.	1.511	0.297	0.00
11.84	60.84	67133.	1.541	0.303	0.00
12.06	61.06	68380.	1.570	0.310	0.00
12.28	61.28	69628.	1.598	0.316	0.00
12.51	61.51	70932.	1.628	0.322	0.00
12.73	61.73	72179.	1.657	0.328	0.00
12.96	61.96	73483.	1.687	0.334	0.00
13.18	62.18	74731.	1.716	0.339	0.00
13.25	62.25	75128.	1.725	0.341	0.00
13.35	62.35	75695.	1.738	0.805	0.00
13.45	62.45	76262.	1.751	1.650	0.00
13.55	62.55	76829.	1.764	2.750	0.00
13.65	62.65	77396.	1.777	4.050	0.00
13.75	62.75	77963.	1.790	5.520	0.00
13.85	62.85	78530.	1.803	6.950	0.00
13.95	62.95	79097.	1.816	7.480	0.00
14.05	63.05	79664.	1.829	7.970	0.00
14.15	63.15	80231.	1.842	8.440	0.00
14.25	63.25	80798.	1.855	8.870	0.00
14.35	63.35	81365.	1.868	9.290	0.00
14.45	63.45	81932.	1.881	9.690	0.00
14.55	63.55	82499.	1.894	10.070	0.00

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14.65	63.65	83066.	1.907	10.440	0.00
14.75	63.75	83633.	1.920	10.800	0.00
14.85	63.85	84200.	1.933	11.140	0.00
14.95	63.95	84767.	1.946	11.480	0.00
15.05	64.05	85334.	1.959	11.800	0.00
15.15	64.15	85901.	1.972	12.110	0.00

Hyd	Inflow	Outflow	Peak Stage	Peak Elev	Storage (Cu-Ft)	Storage (Ac-Ft)
1	2.66	2.25	13.50	62.50	76570.	1.758
2	1.35	0.77	13.34	62.34	75653.	1.737
3	1.41	0.32	12.54	61.54	71119.	1.633
4	1.61	0.27	10.90	59.90	61808.	1.419
5	1.44	0.27	10.62	59.62	60240.	1.383
6	1.34	0.11	6.37	55.37	36136.	0.830
7	1.60	0.09	4.40	53.40	24949.	0.573
8	1.17	0.11	6.84	55.84	38788.	0.890

Hyd	R/D Facility Outflow	Tributary Inflow	Reservoir Inflow	POC Outflow Target	POC Outflow Calc
1	2.25	0.33	********	*******	2.51
2	0.77	0.16	********	*******	0.85
3	0.32	0.16	********	0.44	0.44
4	0.27	0.19	********	*******	0.37
5	0.27	0.17	********	*******	0.35
6	0.11	0.14	********	0.24	0.24
7	0.09	0.17	********	*******	0.23
8	0.11	0.13	********	*******	0.22

Route Time Series through Facility
Inflow Time Series File:devnorth.tsf
Outflow Time Series File:Vaultout
POC Time Series File:dsout

Inflow/Outflow Analysis
Peak Inflow Discharge: 2.66 CFS at 6:00 on Jan 9 in Year 8
Peak Outflow Discharge: 2.25 CFS at 9:00 on Jan 9 in Year 8
Peak Reservoir Stage: 13.50 Ft
Peak Reservoir Elev: 62.50 Ft
Peak Reservoir Storage: 76570. Cu-Ft
: 1.758 Ac-Ft

Add Time Series:bypass.tsf
Peak Summed Discharge: 2.51 CFS at 9:00 on Jan 9 in Year 8
Point of Compliance File:dsout.tsf
Flow Frequency Analysis
Time Series File:vaultout.tsf
Project Location:Sea-Tac

---Annual Peak Flow Rates--- Flow Rate (CFS)	Rank	Time of Peak	-----Flow Frequency Analysis------- - - Peaks - - (CFS)	(ft)	Rank	Return Period	Prob
0.771	2	2/09/01 19:00	2.25	13.50	1	100.00	0.990
0.111	7	12/28/01 18:00	0.771	13.34	2	25.00	0.960
0.275	4	3/06/03 22:00	0.323	12.54	3	10.00	0.900
0.107	8	8/26/04 6:00	0.275	10.90	4	5.00	0.800

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0.122	6	1/05/05 16:00	0.266	10.62	5	3.00	0.667
0.266	5	1/18/06 23:00	0.122	8.32	6	2.00	0.500
0.323	3	11/24/06 8:00	0.111	6.84	7	1.30	0.231
2.25	1	1/09/08 9:00	0.107	6.37	8	1.10	0.091
Computed Peaks			1.75	13.46		50.00	0.980

Flow Frequency Analysis
Time Series File:dsout.tsf
Project Location:Sea-Tac

---Annual Peak Flow Rates---			-----Flow Frequency Analysis-------			
Flow Rate (CFS)	Rank	Time of Peak	- - Peaks - - (CFS)	Rank	Return Period	Prob
0.849	2	2/09/01 19:00	2.51	1	100.00	0.990
0.215	8	1/05/02 16:00	0.849	2	25.00	0.960
0.368	4	3/06/03 18:00	0.442	3	10.00	0.900
0.240	6	8/26/04 2:00	0.368	4	5.00	0.800
0.226	7	10/28/04 16:00	0.355	5	3.00	0.667
0.355	5	1/18/06 20:00	0.240	6	2.00	0.500
0.442	3	11/24/06 4:00	0.226	7	1.30	0.231
2.51	1	1/09/08 9:00	0.215	8	1.10	0.091
Computed Peaks			1.96		50.00	0.980

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

Vaultout.pks

Flow Frequency Analysis

Time Series File:vaultout.tsf

Project Location:Sea-Tac

---Annual Peak Flow Rates---				-----Flow Frequency Analysis------				
Flow Rate (CFS)	Rank	Time of Peak		- - Peaks - - (CFS)	(ft)	Rank	Return Period	Prob
0.771	2	2/09/01	19:00	2.25	13.50	1	100.00	0.99
0.111	7	12/28/01	18:00	0.771	13.34	2	25.00	0.96
0.275	4	3/06/03	22:00	0.323	12.54	3	10.00	0.90
0.107	8	8/26/04	6:00	0.275	10.90	4	5.00	0.80
0.122	6	1/05/05	16:00	0.266	10.62	5	3.00	0.66
0.266	5	1/18/06	23:00	0.122	8.32	6	2.00	0.50
0.323	3	11/24/06	8:00	0.111	6.84	7	1.30	0.23
2.25	1	1/09/08	9:00	0.107	6.37	8	1.10	0.09
Computed Peaks				1.75	13.46		50.00	0.98

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Recordso.exc
KCRTS Program...File Directory:
C:\KC_SWDM\KC_DATA\
[C] CREATE a new Time Series
ST
0.93 0.00 0.000000 Till Forest
3.46 0.00 0.000000 Till Pasture
0.00 0.00 0.000000 Till Grass
0.00 0.00 0.000000 Outwash Forest
0.00 0.00 0.000000 Outwash Pasture
0.00 0.00 0.000000 Outwash Grass
0.00 0.00 0.000000 Wetland
0.24 0.00 0.000000 Impervious
Presouth.tsf
T
1.00000
T
[C] CREATE a new Time Series
ST
0.93 0.00 0.000000 Till Forest
0.00 0.00 0.000000 Till Pasture
0.81 0.00 0.000000 Till Grass
0.00 0.00 0.000000 Outwash Forest
0.00 0.00 0.000000 Outwash Pasture
0.00 0.00 0.000000 Outwash Grass
0.00 0.00 0.000000 Wetland
2.89 0.00 0.000000 Impervious
Devsouth.tsf
T
1.00000
T
[T] Enter the Analysis TOOLS Module
[P] Compute PEAKS and Flow Frequencies
presouth.tsf
Presouth.pks
[P] Compute PEAKS and Flow Frequencies
devsouth.tsf
Devsouth.pks
[R] RETURN to Previous Menu
[F] Size a Retention/Detention FACILITY
Manual Design
Southpond.rdf
5 Route Time Series
0 Return to Main Menu

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Presouth.pks

Flow Frequency Analysis

Time Series File:presouth.tsf

Project Location:Sea-Tac

---Annual Peak Flow Rates---				-----Flow Frequency Analysis------			
Flow Rate (CFS)	Rank	Time of Peak		- - Peaks - - (CFS)	Rank	Return Period	Prob
0.340	2	2/09/01	15:00	0.598	1	100.00	0.99
0.157	7	1/05/02	16:00	0.340	2	25.00	0.96
0.326	3	2/28/03	3:00	0.326	3	10.00	0.90
0.075	8	8/26/04	2:00	0.311	4	5.00	0.80
0.188	6	1/05/05	8:00	0.295	5	3.00	0.66
0.311	4	1/18/06	16:00	0.188	6	2.00	0.50
0.295	5	11/24/06	4:00	0.157	7	1.30	0.23
0.598	1	1/09/08	6:00	0.075	8	1.10	0.09
Computed Peaks				0.512		50.00	0.98

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Devsouth.pks

Flow Frequency Analysis

Time Series File:devsouth.tsf

Project Location:Sea-Tac

---Annual Peak Flow Rates---				-----Flow Frequency Analysis------			
Flow Rate (CFS)	Rank	Time of Peak		- - Peaks - - (CFS)	Rank	Return Period	Prob
0.810	6	2/09/01	2:00	1.61	1	100.00	0.99
0.669	8	1/05/02	16:00	1.07	2	25.00	0.96
0.962	3	2/27/03	7:00	0.962	3	10.00	0.90
0.735	7	8/26/04	2:00	0.879	4	5.00	0.80
0.879	4	10/28/04	16:00	0.865	5	3.00	0.66
0.865	5	1/18/06	16:00	0.810	6	2.00	0.50
1.07	2	10/26/06	0:00	0.735	7	1.30	0.23
1.61	1	1/09/08	6:00	0.669	8	1.10	0.09
Computed Peaks				1.43		50.00	0.98

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Rdout.pks

Flow Frequency Analysis
Time Series File:rdout.tsf
Project Location:Sea-Tac

---Annual Peak Flow Rates---							
Flow Rate (CFS)	Rank	Time of Peak	- - Peaks - - (CFS)	(ft)	Rank	Return Period	Prob
0.526	2	2/09/01 19:00	1.10	4.14	1	100.00	0.99
0.149	7	1/06/02 5:00	0.526	4.04	2	25.00	0.96
0.283	5	2/28/03 7:00	0.326	4.00	3	10.00	0.90
0.147	8	8/24/04 0:00	0.316	3.83	4	5.00	0.80
0.188	6	1/05/05 14:00	0.283	3.39	5	3.00	0.66
0.316	4	1/18/06 22:00	0.188	2.68	6	2.00	0.50
0.326	3	11/24/06 7:00	0.149	1.66	7	1.30	0.23
1.10	1	1/09/08 10:00	0.147	1.62	8	1.10	0.09
Computed Peaks			0.907	4.11		50.00	0.98

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Retention/Detention Facility

Type of Facility:	Detention Pond	
Side Slope:	3.00	H:1V
Pond Bottom Length:	93.95	ft
Pond Bottom Width:	46.98	ft
Pond Bottom Area:	4413.	sq. ft
Top Area at 1 ft. FB:	9541.	sq. ft
	0.219	acres
Effective Storage Depth:	4.00	ft
Stage 0 Elevation:	58.00	ft
Storage Volume:	25186.	cu. ft
	0.578	ac-ft
Riser Head:	4.00	ft
Riser Diameter:	18.00	inches
Number of orifices:	2	

Orifice #	Height (ft)	Diameter (in)	Full Head Discharge (CFS)	Pipe Diameter (in)
1	0.00	2.06	0.230	
2	2.68	1.76	0.096	4.0

Top Notch Weir: None
Outflow Rating Curve: None

Stage (ft)	Elevation (ft)	Storage (cu. ft)	Storage (ac-ft)	Discharge (cfs)	Percolation (cfs)	Surf Area (sq. ft)
0.00	58.00	0.	0.000	0.000	0.00	4413.
0.02	58.02	88.	0.002	0.017	0.00	4430.
0.04	58.04	177.	0.004	0.024	0.00	4447.
0.06	58.06	266.	0.006	0.029	0.00	4464.
0.09	58.09	401.	0.009	0.034	0.00	4490.
0.11	58.11	491.	0.011	0.038	0.00	4507.
0.13	58.13	581.	0.013	0.041	0.00	4524.
0.15	58.15	672.	0.015	0.045	0.00	4541.
0.17	58.17	763.	0.018	0.048	0.00	4558.
0.19	58.19	854.	0.020	0.051	0.00	4575.
0.29	58.29	1316.	0.030	0.062	0.00	4662.
0.39	58.39	1786.	0.041	0.072	0.00	4749.
0.49	58.49	2266.	0.052	0.081	0.00	4836.
0.59	58.59	2754.	0.063	0.089	0.00	4925.
0.69	58.69	3251.	0.075	0.096	0.00	5014.
0.79	58.79	3756.	0.086	0.102	0.00	5104.
0.89	58.89	4271.	0.098	0.109	0.00	5194.
0.99	58.99	4795.	0.110	0.115	0.00	5286.
1.09	59.09	5328.	0.122	0.120	0.00	5378.
1.19	59.19	5871.	0.135	0.126	0.00	5471.
1.29	59.29	6423.	0.147	0.131	0.00	5564.
1.39	59.39	6984.	0.160	0.136	0.00	5658.
1.49	59.49	7554.	0.173	0.141	0.00	5753.
1.59	59.59	8134.	0.187	0.145	0.00	5849.
1.69	59.69	8724.	0.200	0.150	0.00	5945.
1.79	59.79	9323.	0.214	0.154	0.00	6042.
1.89	59.89	9933.	0.228	0.158	0.00	6140.
1.99	59.99	10551.	0.242	0.162	0.00	6239.

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2.09	60.09	11180.	0.257	0.166	0.00	6338.
2.19	60.19	11819.	0.271	0.170	0.00	6438.
2.29	60.29	12468.	0.286	0.174	0.00	6538.
2.39	60.39	13127.	0.301	0.178	0.00	6640.
2.49	60.49	13796.	0.317	0.182	0.00	6742.
2.59	60.59	14475.	0.332	0.185	0.00	6845.
2.68	60.68	15095.	0.347	0.188	0.00	6938.
2.70	60.70	15234.	0.350	0.190	0.00	6959.
2.72	60.72	15374.	0.353	0.192	0.00	6980.
2.73	60.73	15444.	0.355	0.196	0.00	6990.
2.75	60.75	15584.	0.358	0.201	0.00	7011.
2.77	60.77	15724.	0.361	0.207	0.00	7032.
2.79	60.79	15865.	0.364	0.215	0.00	7053.
2.81	60.81	16006.	0.367	0.223	0.00	7074.
2.83	60.83	16148.	0.371	0.225	0.00	7095.
2.84	60.84	16219.	0.372	0.228	0.00	7105.
2.94	60.94	16935.	0.389	0.240	0.00	7210.
3.04	61.04	17661.	0.405	0.251	0.00	7317.
3.14	61.14	18398.	0.422	0.261	0.00	7423.
3.24	61.24	19146.	0.440	0.270	0.00	7531.
3.34	61.34	19904.	0.457	0.279	0.00	7639.
3.44	61.44	20673.	0.475	0.287	0.00	7748.
3.54	61.54	21454.	0.493	0.294	0.00	7858.
3.64	61.64	22245.	0.511	0.302	0.00	7968.
3.74	61.74	23047.	0.529	0.309	0.00	8079.
3.84	61.84	23861.	0.548	0.316	0.00	8191.
3.94	61.94	24686.	0.567	0.322	0.00	8304.
4.00	62.00	25186.	0.578	0.326	0.00	8372.
4.10	62.10	26029.	0.598	0.794	0.00	8485.
4.20	62.20	26883.	0.617	1.650	0.00	8600.
4.30	62.30	27749.	0.637	2.750	0.00	8715.
4.40	62.40	28626.	0.657	4.050	0.00	8831.
4.50	62.50	29515.	0.678	5.520	0.00	8947.
4.60	62.60	30416.	0.698	6.950	0.00	9065.
4.70	62.70	31328.	0.719	7.490	0.00	9183.
4.80	62.80	32252.	0.740	7.980	0.00	9301.
4.90	62.90	33188.	0.762	8.450	0.00	9421.
5.00	63.00	34136.	0.784	8.890	0.00	9541.
5.10	63.10	35096.	0.806	9.310	0.00	9662.
5.20	63.20	36069.	0.828	9.720	0.00	9784.
5.30	63.30	37053.	0.851	10.100	0.00	9906.
5.40	63.40	38050.	0.874	10.470	0.00	10029.
5.50	63.50	39059.	0.897	10.830	0.00	10153.
5.60	63.60	40081.	0.920	11.180	0.00	10277.
5.70	63.70	41115.	0.944	11.510	0.00	10403.
5.80	63.80	42161.	0.968	11.840	0.00	10529.
5.90	63.90	43220.	0.992	12.160	0.00	10655.
6.00	64.00	44292.	1.017	12.470	0.00	10783.

Hyd	Inflow	Outflow		Peak		Storage	
		Target	Calc	Stage	Elev	(Cu-Ft)	(Ac-Ft)
1	1.61	*******	1.10	4.14	62.14	26334.	0.605
2	0.81	*******	0.53	4.04	62.04	25545.	0.586
3	0.82	0.33	0.33	4.00	62.00	25173.	0.578
4	0.86	*******	0.32	3.83	61.83	23808.	0.547
5	0.96	*******	0.28	3.39	61.39	20324.	0.467
6	0.52	0.19	0.19	2.68	60.68	15088.	0.346

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7	0.67	*******	0.15	1.66	59.66	8570.	0.197
8	0.74	*******	0.15	1.62	59.62	8329.	0.191

Route Time Series through Facility
Inflow Time Series File:devsouth.tsf
Outflow Time Series File:rdout

Inflow/Outflow Analysis

Peak Inflow Discharge:	1.60	CFS at 6:00 on Jan 9 in Year 8	
Peak Outflow Discharge:	1.10	CFS at 10:00 on Jan 9 in Year 8	
Peak Reservoir Stage:	4.14	Ft	
Peak Reservoir Elev:	62.14	Ft	
Peak Reservoir Storage:	26334.	Cu-Ft	
:	0.605	Ac-Ft	

Flow Frequency Analysis
Time Series File:rdout.tsf
Project Location:Sea-Tac

---Annual Peak Flow Rates---				-----Flow Frequency Analysis-------				
Flow Rate (CFS)	Rank	Time of Peak		- - Peaks - - (CFS)	(ft)	Rank	Return Period	Prob
0.526	2	2/09/01	19:00	1.10	4.14	1	100.00	0.990
0.149	7	1/06/02	5:00	0.526	4.04	2	25.00	0.960
0.283	5	2/28/03	7:00	0.326	4.00	3	10.00	0.900
0.147	8	8/24/04	0:00	0.316	3.83	4	5.00	0.800
0.188	6	1/05/05	14:00	0.283	3.39	5	3.00	0.667
0.316	4	1/18/06	22:00	0.188	2.68	6	2.00	0.500
0.326	3	11/24/06	7:00	0.149	1.66	7	1.30	0.231
1.10	1	1/09/08	10:00	0.147	1.62	8	1.10	0.091
Computed Peaks				0.907	4.11		50.00	0.980

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DOC 27

APPENDIX B – ON-SITE WATER QUALITY CALCULATIONS

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North Wet Pond
Seattle INS

Calculations for Water Quality Treatment (1998 KCSWDM Criteria)
For 6-month, 24-hr Design Event
Design Calculations for Wet Vault
Design Criteria: King County SWDM 6.4.2

Step1: Identify required wetpool volume factor (f)

(•)	Basic	3
( )	Large	4.5

Step 2: Determine rainfall (R) for the mean annual storm.

From Figure 6.69, R= 0.47 inches or 0.039167 feet

Step 3: Calculate runoff from the mean annual storm (Vr) for the developed site.

Volume of runoff from mean annual storm (Vr) = (0.9Ai + 0.25Atg + 0.10Atf + 0.01Ao) x (R/12)

Surface	Area (sf)
Ai (Impervious)	233046
Atg (Till Grass)	26136
Atf (Till Forest)	0
Ao (Outwash)	0

Vr (cf) = (0.9* 233046 +0.25* 26136 +0.10* 0 +0.01* 0)* 0.039167 = 8471

Step 4: Calculate Wetpool Volume

Vb = f * Vr Vb (cf) = 3* 8471 = 25412 cf

Step 5: Determine Wetpool Dimensions

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South Wet Pond
Seattle INS

Calculations for Water Quality Treatment (1998 KCSWDM Criteria)
For 6-month, 24-hr Design Event
Design Calculations for Wet Vault
Design Criteria: King County SWDM 6.4.2

Step1: Identify required wetpool volume factor (f)

(•)	Basic	3
( )	Large	4.5

Step 2: Determine rainfall (R) for the mean annual storm.

From Figure 6.69, R= 0.47 inches or 0.039167 feet

Step 3: Calculate runoff from the mean annual storm (Vr) for the developed site.

Volume of runoff from mean annual storm (Vr) = (0.9Ai + 0.25Atg + 0.10Atf + 0.01Ao) x (R/12)

Surface	Area (sf)
Ai (Impervious)	125888
Atg (Till Grass)	75794
Atf (Till Forest)	0
Ao (Outwash)	0

Vr (cf) = (0.9* 125888 +0.25* 75794 +0.10* 0 +0.01* 0)* 0.039167 = 5180

Step 4: Calculate Wetpool Volume

Vb = f * Vr Vb (cf) = 3* 5180 = 15539 cf

Step 5: Determine Wetpool Dimensions

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APPENDIX C – CONVEYANCE CALCULATIONS

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File: D03-0128

Drawing

#6

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

DISCARD

Location	2-Year MRI		5-Year MRI		10-Year MRI		25-Year MRI		50-Year MRI		100-Year MRI	
	m	n	m	n	m	n	m	n	m	n	m	n
Aberdeen and Hoquiam	5.10	0.488	6.22	0.488	7.06	0.487	8.17	0.487	9.02	0.487	9.86	0.487
Bellingham	4.29	0.549	5.59	0.555	6.59	0.559	7.90	0.562	8.89	0.563	9.88	0.565
Bremerton	3.79	0.480	4.84	0.487	5.63	0.490	6.68	0.494	7.47	0.496	8.26	0.498
Centralia and Chehalis	3.63	0.506	4.85	0.518	5.76	0.524	7.00	0.530	7.92	0.533	8.86	0.537
Clarkston and Colfax	5.02	0.628	6.84	0.633	8.24	0.635	10.07	0.638	11.45	0.639	12.81	0.639
Colville	3.48	0.558	5.44	0.593	6.98	0.610	9.07	0.626	10.65	0.635	12.26	0.642
Ellensburg	2.89	0.590	5.18	0.631	7.00	0.649	9.43	0.664	11.30	0.672	13.18	0.678
Everett	3.69	0.556	5.20	0.570	6.31	0.575	7.83	0.582	8.96	0.585	10.07	0.586
Forks	4.19	0.410	5.12	0.412	5.84	0.413	6.76	0.414	7.47	0.415	8.18	0.416
Hoffstadt Cr. (SR 504)	3.96	0.448	5.21	0.462	6.16	0.469	7.44	0.476	8.41	0.480	9.38	0.484
Hoodsport	4.47	0.428	5.44	0.428	6.17	0.427	7.15	0.428	7.88	0.428	8.62	0.428
Kelso and Longview	4.25	0.507	5.50	0.515	6.45	0.519	7.74	0.524	8.70	0.526	9.67	0.529
Leavenworth	3.04	0.530	4.12	0.542	5.62	0.575	7.94	0.594	9.75	0.606	11.08	0.611
Moses Lake	2.61	0.583	5.05	0.634	6.99	0.655	9.58	0.671	11.61	0.681	13.63	0.688
Mt. Vernon	3.92	0.542	5.25	0.552	6.26	0.557	7.59	0.561	8.60	0.564	9.63	0.567
Naselle	4.57	0.432	5.67	0.441	6.14	0.432	7.47	0.443	8.05	0.440	8.91	0.436
Olympia	3.82	0.466	4.86	0.472	5.62	0.474	6.63	0.477	7.40	0.478	8.17	0.480
Omak	3.04	0.583	5.06	0.618	6.63	0.633	8.74	0.647	10.35	0.654	11.97	0.660
Pasco and Kennewick	2.89	0.590	5.18	0.631	7.00	0.649	9.43	0.664	11.30	0.672	13.18	0.678
Port Angeles	4.31	0.530	5.42	0.531	6.25	0.531	7.37	0.532	8.19	0.532	9.03	0.532
Poulsbo	3.83	0.506	4.98	0.513	5.85	0.516	7.00	0.519	7.86	0.521	8.74	0.523
Queets	4.26	0.422	5.18	0.423	5.87	0.423	6.79	0.423	7.48	0.423	8.18	0.424
Seattle	3.56	0.515	4.83	0.531	5.62	0.530	6.89	0.539	7.88	0.545	8.75	0.545
Sequim	3.50	0.551	5.01	0.569	6.16	0.577	7.69	0.585	8.88	0.590	10.04	0.593
Snoqualmie Pass	3.61	0.417	4.81	0.435	6.56	0.459	7.72	0.459	8.78	0.461	10.21	0.476
Spokane	3.47	0.556	5.43	0.591	6.98	0.609	9.09	0.626	10.68	0.635	12.33	0.643
Stevens Pass	4.73	0.462	6.09	0.470	8.19	0.500	8.53	0.484	10.61	0.499	12.45	0.513
Tacoma	3.57	0.516	4.78	0.527	5.70	0.533	6.93	0.539	7.86	0.542	8.79	0.545
Vancouver	2.92	0.477	4.05	0.496	4.92	0.506	6.06	0.515	6.95	0.520	7.82	0.525
Walla Walla	3.33	0.569	5.54	0.609	7.30	0.627	9.67	0.645	11.45	0.653	13.28	0.660
Wenatchee	3.15	0.535	4.88	0.566	6.19	0.579	7.94	0.592	9.32	0.600	10.68	0.605
Yakima	3.86	0.608	5.86	0.633	7.37	0.644	9.40	0.654	10.93	0.659	12.47	0.663

Figure 2-4.4B *Index to Rainfall Coefficients (English Units)*

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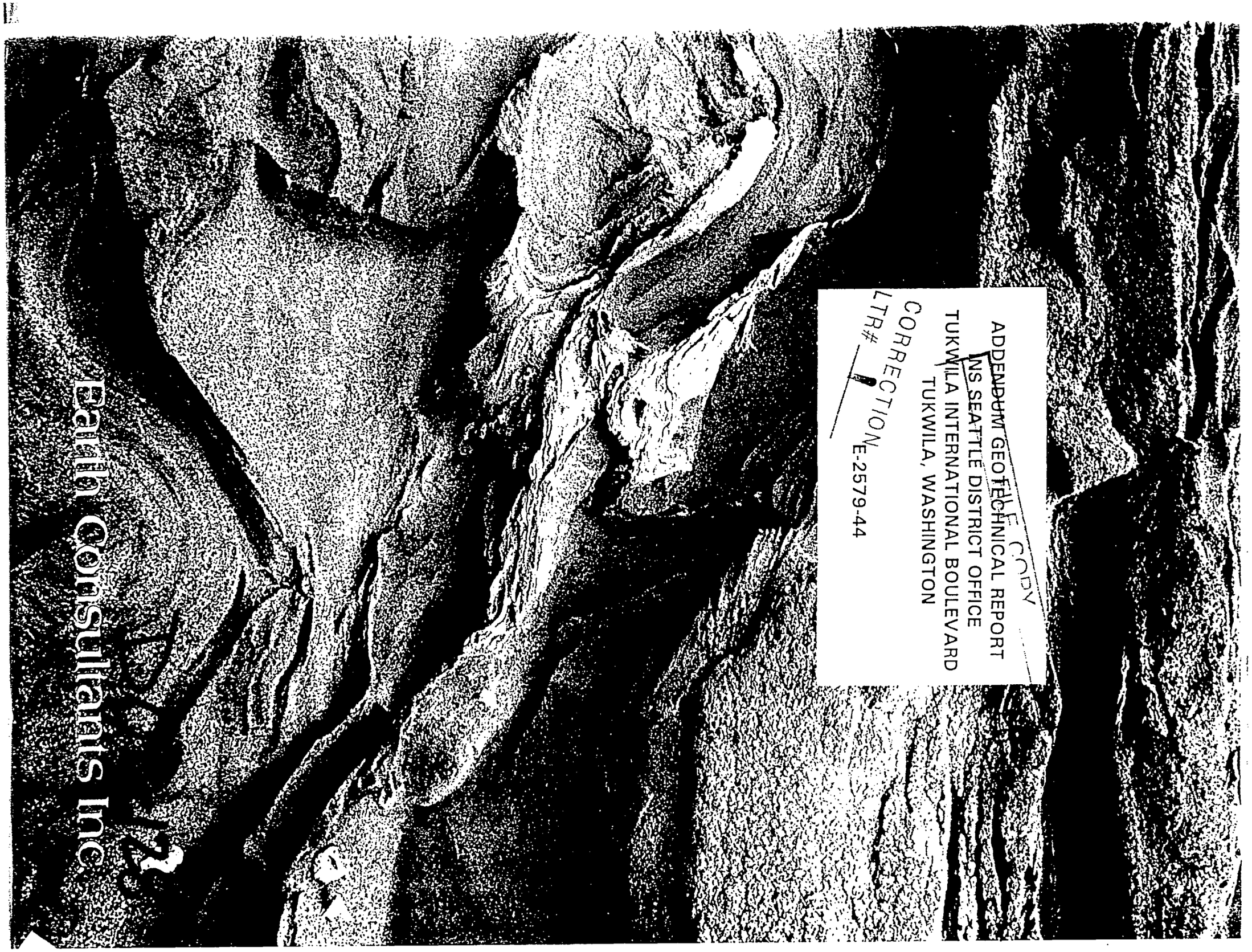

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ADDENDUM GEOTECHNICAL REPORT
INS SEATTLE DISTRICT OFFICE
TUKWILA INTERNATIONAL BOULEVARD
TUKWILA, WASHINGTON

E-2579-44

June 11, 2003

PREPARED FOR
SABEY CORPORATION

Earth Consultants, Inc.
1805 - 136th Place Northeast, Suite 201
Bellevue, Washington 98005
(425) 643-3780
Toll Free 1-888-739-6670

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CITY OF TUKWILA
JUL 01 2003
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CORRECTION
LTR# 1

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CITY OF TUKWILA
DEVELOPMENT SERVICES

Earth Consultants, Inc.
Geotechnical Engineers, Geologists & Environmental Scientists
Construction Testing & ICBO WABO Inspection Services

Established 1975

June 11, 2003

E-2579-44

Sabey Corporation
12201 Tukwila International Boulevard
Fourth Floor
Seattle, Washington 98168-5121

Attention: Mr. Stanley Paulus

Subject: Geotechnical Addendum
Retaining Wall Drainage and Backfill
INS Seattle District Office
Tukwila, Washington

Reference: Earth Consultants, Inc.
Geotechnical Engineering Study
E-2579-44, dated February 20, 2003

Dear Mr Paulus:

In accordance with your request Earth Consultants, Inc. (ECI) has reviewed our recommendations for the building retaining wall drainage and backfill. Additionally, we have prepared recommendations for reinforced backfill for the proposed garage structure retaining walls.

Retaining Wall Drainage and Backfill

We understand use of a liquid membrane is being considered for the exterior foundation walls of the INS Building. At this time Carlisle CCW-500R reinforced hot applied, liquid membrane system is being considered. In our opinion, use of the liquid membrane in combination with a sheet drain material such as Mira-Drain 6000 or approved equivalent should provide adequate moisture protection and dissipation of hydrostatic pressures. The attached Plate 1 illustrates a typical drainage and backfill detail for the foundation walls. As illustrated on Plate1, an eighteen (18) inch zone of free draining backfill should be utilized immediately behind the wall.

1805 136th Place N.E., Suite 201, Bellevue, WA 98005
Bellevue (425) 643-3780 FAX (425) 746-0860 Toll Free (888) 739-6670

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Reinforced Backfill – Garage Structure

The height of the foundation walls will be on the order of twenty-seven (27) feet at some locations along the west side of the structure. On the east side of the garage structure, a series of pre-cast concrete panels supported on the foundation grade beams will be utilized to support the slab-on-grade structural fill.

To reduce the design earth pressures on the foundation walls and pre-cast panels, the wall backfill should be reinforced with a woven geotextile. The required spacing and length of the woven geotextile for the reinforced fill was analyzed using the FHWA Chart Solution (FHWA –SA-96-071). The calculations and a schematic cross section of the reinforced fill zone are attached to this letter. The following table presents the recommended spacing and length for the geotextile reinforcement. This table provides recommendations for reinforced fill up to twenty-seven (27) feet. The geotextile used for the reinforcement should be Mirafi 600X or approved equivalent. The geotextile should be wrapped at the face and embedded at least three feet.

Geotextile Spacing and Length (ft.)

Layer No.	Distance (z) From Wall Base	Length of Geotextile
1	1 ft.	6 ft.
2	3 ft.	8 ft.
3	5 ft.	10 ft.
4	7 ft.	10 ft.
5	9 ft.	10 ft.
6	11 ft.	10 ft.
7	13 ft.	10 ft.
8	15 ft.	15 ft.
9	17 ft.	15 ft.
10	19 ft.	15 ft.
11	21 ft.	15 ft.
12	23 ft.	18 ft.
13	25 ft.	21 ft.

The attached Plate 2 illustrates the reinforced fill zone and gravel drainage zone between the wall and the fill zone. The width of the gravel drainage zone between the back of the wall and the reinforced fill should be at least eighteen (18) inches.

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Fill Placement and Compaction

The reinforced fill behind the foundation wall and pre-cast panels should be constructed prior to placing the gravel backfill for the drainage zone. This will allow the reinforced fill zone to mobilize the strength of the geotextile reinforcement, thereby allowing the foundation wall to be designed with a reduced value of earth pressure. The reinforced fill should consist of granular soil with a moisture content at or near the optimum moisture content. The native soils may be suitable for use as fill, provided the soil is at or near the optimum moisture content at the time of construction. The native soil is moisture sensitive, and will become unstable if exposed to excessive moisture. Fill for use during wet weather conditions should consist of a granular soil with less than 5 percent fines. The fill should be placed in minimum twelve (12) inch lifts and compacted to 90 percent of the maximum dry density as determined by the Modified Proctor Method (ASTM D-1557-91). An ECI representative should observe the reinforced fill construction and periodically perform density testing of the compacted fill.

Earth Pressures

Provided the reinforced fill zone behind the proposed foundation wall and pre-cast panels is constructed as recommended above, earth pressures for design of the walls and panels can be calculated using an equivalent fluid pressure of 15 pounds per cubic foot (pcf). As discussed above, the reinforced fill will need to be constructed prior to placement of the gravel drainage layer between the reinforced fill and the back of the wall or panels. For seismic loading, a value of 3H pounds per square foot (psf), where H is the height of the foundation wall or pre-cast panel, should be applied in a rectangular distribution along the height of the wall or panel.

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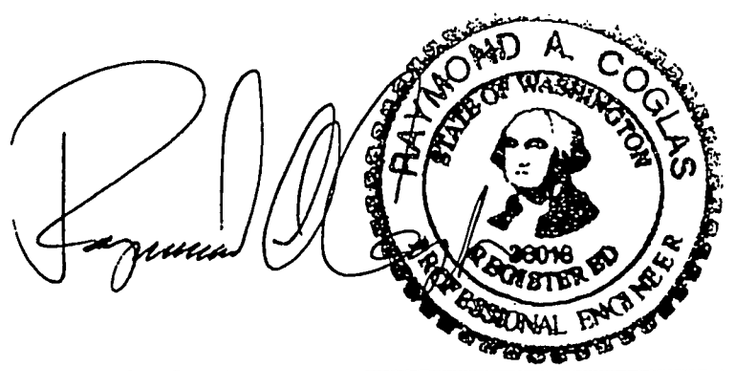
We trust this information meets your current needs. If you have any questions or need additional information, please contact us.

Sincerely,

EARTH CONSULTANTS, INC.



6/12/03

Raymond A. Coglas, P.E. EXPIRES 7/29/2004
Project Manager

RAC/csm

Attachments:

Plate 1	Foundation Wall Drainage and Backfill
Plate 2	Reinforced Fill Zone
Appendix A	Calculations

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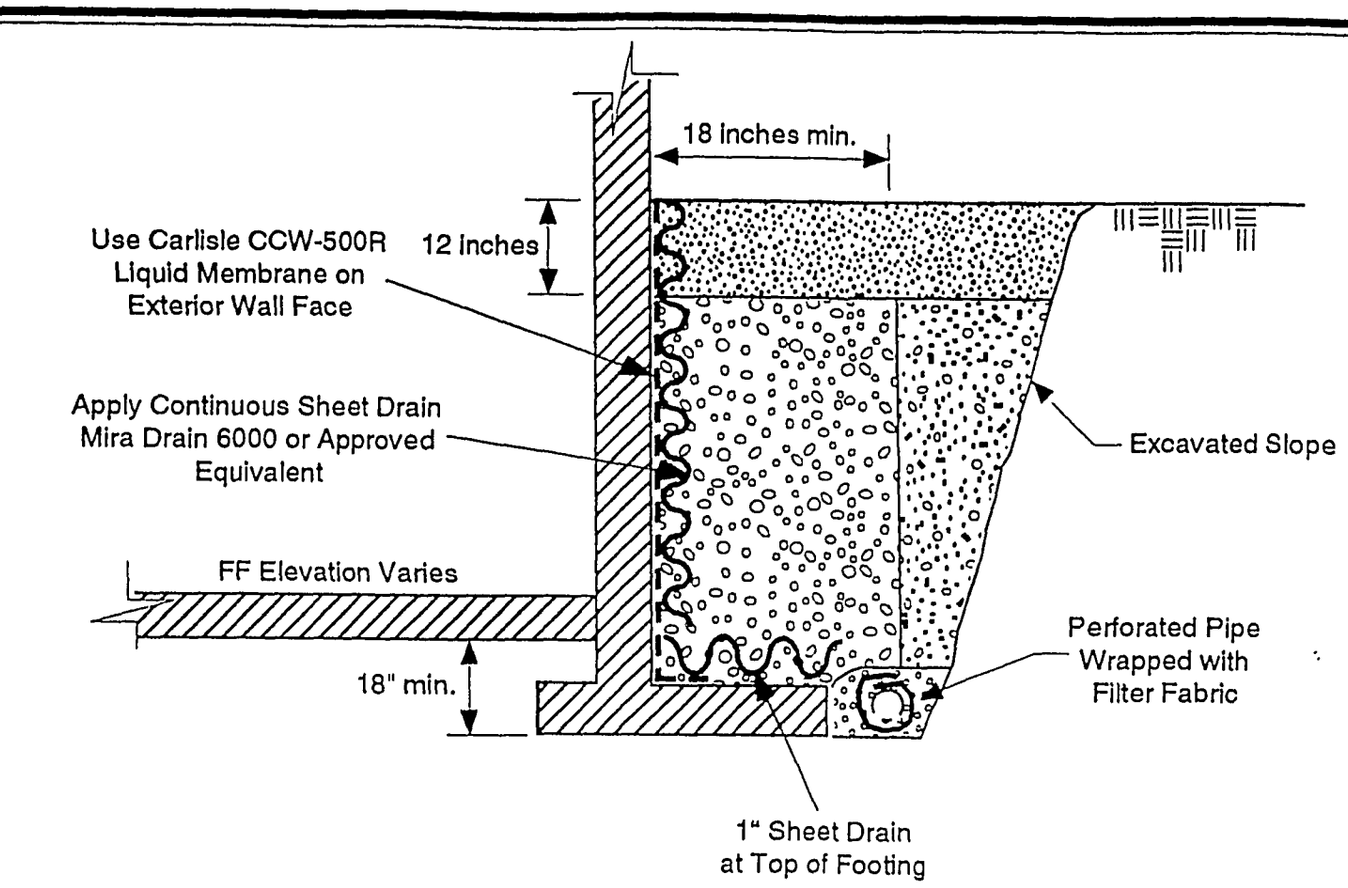

STANDARD NOTES

1) Free draining backfill should consist of granular soil having no more than 5 percent passing the #200 sieve and no particles greater than 4 inches in diameter. The percentage of particles passing the #4 sieve should be between 25 and 75 percent.

2) Structural Fill backfill should be free of organics, clayey soils, debris and other deleterious materials. It should be placed at or below the optimum moisture content.

3) Drain pipe; perforated or slotted rigid PVC pipe laid with perforations or slots facing down; tight jointed; with a positive gradient. Do not use flexible corrugated plastic pipe. Drain line should be bedded on and surround with free draining 1 inch drain rock. The drain rock may be encapsulated with a geotechnical drainage fabric at the engineers discretion.

LEGEND

- Surface Seal; Native Soil or other low permeability Material
- 18 inches minimum of Free Draining Backfill
- Structural Fill Backfill 90 percent relative compaction
- 1 inch Drain Rock

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NOT A CONSTRUCTION DRAWING

Earth Consultants, Inc.
Geotechnical Engineers, Geologists & Environmental Scientists
Construction Testing & ICBO WABO Inspection Services

FOUNDATION WALL DRAINAGE AND BACKFILL
INS Building / Garage
Tukwila, Washington

Drwn. GLS	Date June 2003	Proj. No. 2579-44
Checked RAC	Date 6/11/03	Plate 1

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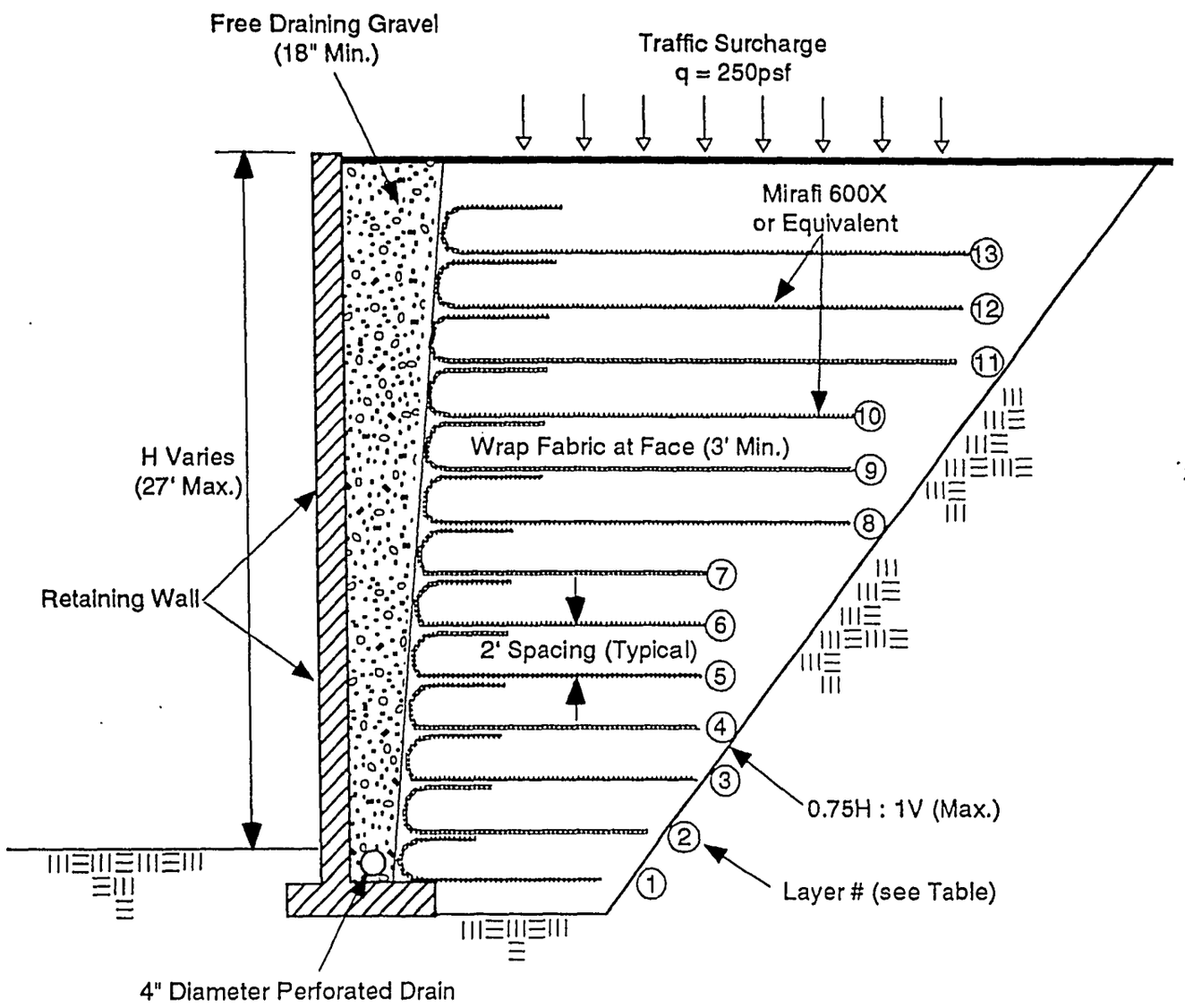

Reinforced Fill Zone

(See Table for Fabric Spacing and Lengths)

NOTE: Reinforced Earth Fill must be constructed prior to placement of gravel drainage layer.

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Earth Consultants, Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

REINFORCED FILL ZONE
INS Garage Wall
Tukwila, Washington

Drwn. GLS	Date June 2003	Proj. No. 2579-44
Checked RAC	Date 6/11/03	Plate 2

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Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

COMPUTED BY RAK DATED 6/12/03
CHECKED BY _____ DATED _____
PROJECT NO. 2579-44 SHEET 1 OF _____
SUBJECT Reinf. Fill

PROJECT INS Garage

- Ck. Req. Reinf For 27ft High Fill (max)

  Use FHWA Chart Solution - FHWA-SA-96-071

- Determine Coeff "K" From Chart A of Fig. 63

  $\phi'_f = \tan^{-1}\left(\frac{\tan\phi_r}{FS}\right)$ FS = 1.5

  $\phi_r = 35°$

  $\phi_f = 25°$

  Use $\beta = 80°$ (Wall Face Angle From Horiz.)

  From Chart A $K = 0.39$

- Determine $T_{S\,max} = 0.5\,K\,\gamma\,H'^2$

  $H' = H + q/\gamma_r$ q = Vertical Surcharge (260psf)

  $H' = 27ft + 2ft = 29ft$

  $T_S = 0.5(0.39) \cdot 130pcf\,(29ft)^2 = 21{,}320\,\#/l$

- From Chart B - Fig 63, Reinf. Length Ratio

  $L/H' = 0.7$ ($\beta = 80°$)

  Reinf. Length = $29ft \cdot 0.7 = \underline{\underline{20ft}}$

  → Use 15ft to 21ft Lengths throughout upper regions (see Table of Text)

  → Shorter lengths can be utilized throughout lower regions due to increased overburden and resistance to pullout

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Earth Consultants Inc.
Geotechnical Engineers, Geologists & Environmental Scientists

COMPUTED BY RAC DATED 6/12/03
CHECKED BY _____ DATED _____
PROJECT NO. 2579-44 SHEET 2 OF _____
PROJECT INS Garage
SUBJECT Reinf. Fill

- Ck. Tall for Mirafi 600x

$T_{ult} = 3,780$ lbs/ft

$$T_{all} = \frac{3,780}{1.2 \times 1.5} = 2,100 \text{ lbs/ft}$$

FS = 1.2 (Installation Damage)

FS = 1.5 (Creep)

- Ck Max. Stress For H' = 29 ft and Vertical Spacing = 2 ft.

For S_v = 2ft, Use 13 Layers (H = 27ft)

$$T_{max} = \frac{T_s}{\#\text{Layers}} = \frac{21,320 \#/\text{l}}{13 \text{ Layers}}$$

$= 1,640$ lbs/ft

1,640 lbs/ft < Tall OK

Use Mirafi 600x and S_v = 2ft

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DRAFT

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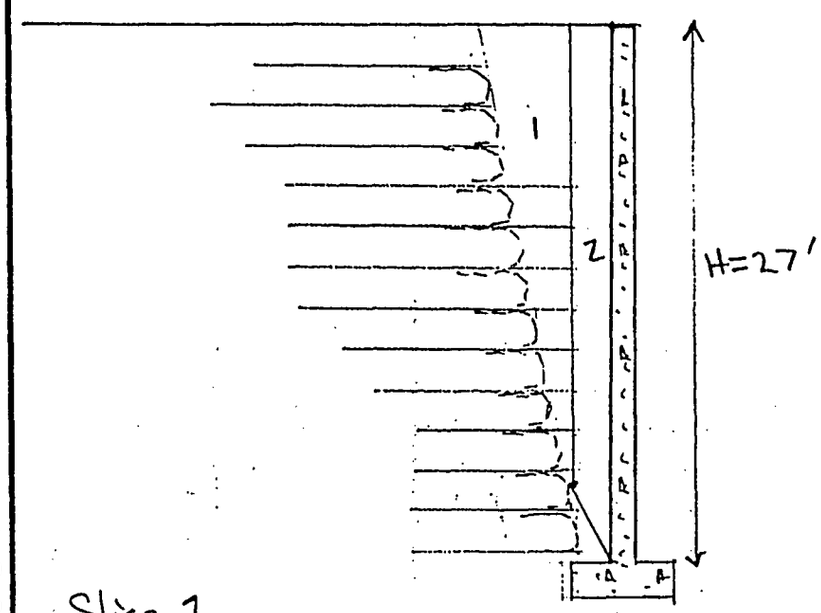
Geotechnical Engineers, Geologists & Environmental Scientists

COMPUTED BY RAC DATED 6/12/03
CHECKED BY _____ DATED _____
PROJECT NO. 259-44 SHEET 3 OF _____
PROJECT INS Garage
SUBJECT EP - Reinf Fill and Pea Gravel

• Ck. Earth Pressure Due To Pea Gravel Backfill

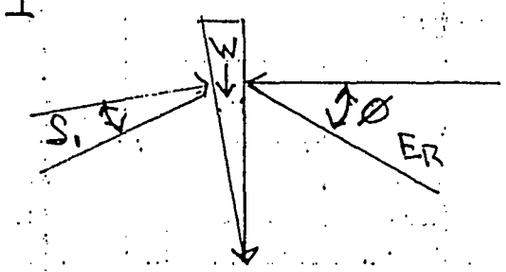


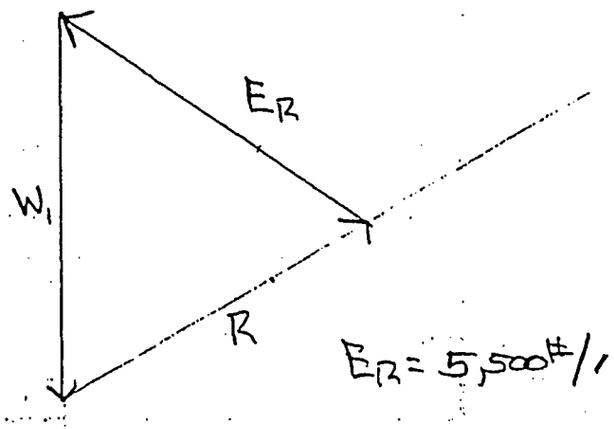
$\gamma_m = 110$ pcf (pea gravel)
$\phi = 34°$

$W_1 = 5570$ lbs/ft
$W_2 = 5445$

$\delta_1 = 1/2\,\phi = 17°$
$\delta_2 = 2/3\,\phi = 23°$

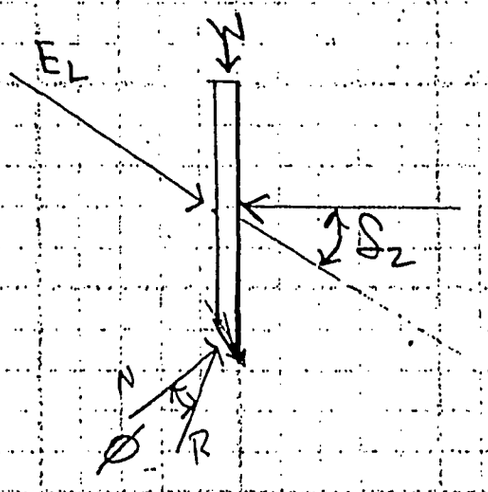
Slice 1

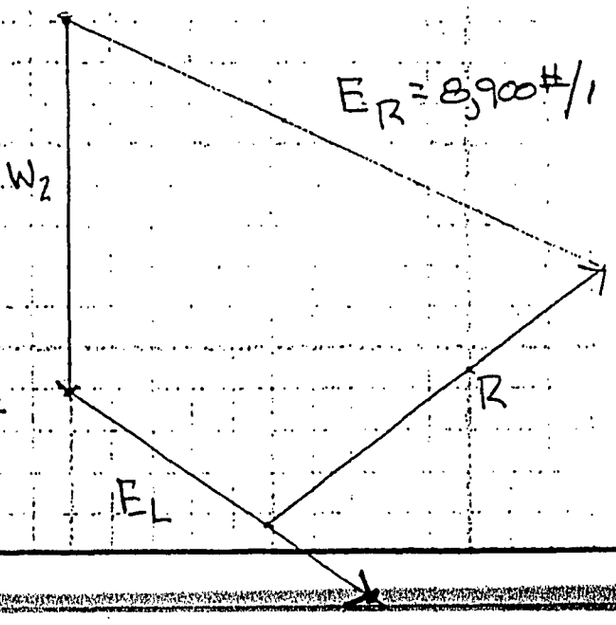




$E_R = 5{,}500$ #/'

Slice 2





$E_R = 8{,}900$ #/'

Use $EFP = \dfrac{8{,}900\text{ \#/'}}{(27')^2} = 12.2$ pcf

Use 15 pcf

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DO NOT SCALE

KING COUNTY
WATER DISTRICT NO. 20

12606 First Avenue South
Seattle, Washington 98168

SABEY CORPORATION
INS BUILDING #9

DEVELOPER EXTENSION
HYDRAULIC STUDY

RECEIVED
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JUN 11 2003
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April, 2003

CHS ENGINEERS INC.

CHS Engineers, Inc.
12507 Bel-Red Road, Suite 101
Bellevue, Washington 98005-2500
(206) 637-3693

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BELLEVUE

KING COUNTY WATER DISTRICT NO. 20
SABEY CORPORATION DEVELOPER EXTENSION
INS BUILDING NO. 9

BACKGROUND AND ASSUMPTIONS

The project is located on the east side of SR 99 generally between about South 122nd Street and South 126th Street. The new development is across SR 99 from the Pacific View Office Park project constructed in 1999.

The proposed project is in Water District 20 Pressure Zone 456. Zone 456 extends from South 128th Street to approximately South 106th Street. The zone follows the side of the hill.

At the south end, the Zone is a narrow strip of hillside between Military Road and the District boundary along SR 99. At South 120th Street, the Zone widens to the west to nearly 16th Avenue South.

Pressure Zone 456 is supplied with water from six supply points consisting of master meter connections to the Seattle Public Utilities system and Water District 20 PRV stations coming down the hill from Pressure Zone 575.

Supply points are as follows:

1. Master Meter from SPU at Military Road/South 128th Street
2. Master Meter from SPU at Military Road/South 125th Street
3. Master Meter from SPU at Des Moines Drive/South 112th Street
4. Master Meter from SPU at 14th Avenue South/South 112th Street
5. PRV Station from Zone 575 at 8th Avenue South/South 112th Street
6. Master Meter from SPU at 8th Avenue South/South 110th Street

Because of the long linear nature of Zone 456 and the layout of the existing pipe network, only the first three supply points have an appreciable effect on the south end of the zone in the area of the proposed project.

In addition, because of the long linear nature of Zone 456 and the fact that the SPU's supply system in Military Road consists of a dead end 12" main which supplies the two meters at S. 125th Street and S. 128th Street, two new PRV stations are proposed to be constructed to provide adequate water supply in the event that the SPU's system is out of service. Installation of these two PRV's will be at S. 122nd Street and S. 128th Street and will supply water to Zone 456 from the District's upper Zone 575.

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Due to the proposed development (building height, type, layout, occupancy, etc.), water supply requirements have been determined by the fire marshal. These flow requirements include:

1. Provision of a pressure of 100 psi at the proposed roof elevation of 180 feet under a fire sprinkler flow condition of 750 gpm.
2. Provision of a minimum pressure of 20 psi in the District's system at a fire flow condition of 3,500 gpm.

Hydraulic simulations have been done using the WaterCad Hydraulic software developed by Haestad Methods. Basic assumptions for the hydraulic model include the minimum supply pressures provided by the SPU system, the ultimate average day demands and the existing pipe network in Zone 456. Minimum hydraulic gradient provided by the SPU's system in Military Road is a 400 foot gradient. Gradient provided at Des Moines/S. 112th Street in the 48" SPU pipe is 430 feet.

HYDRAULIC ANALYSIS

Several hydraulic simulations were performed to analyze the system under the various conditions to determine adequacy of water supply to meet the demand requirements. Copies of the output and a copy of the pressure zone map are included and are discussed below:

The analyses include the normal static run without any sprinkler or fire demands, a sprinkler demand of 750 gpm and a fire flow demand of 3,500 gpm in the area of the proposed development (Node 1840). Various supply conditions were assumed with SPU's system on Military Road either on or off and the new PRV stations along Military Road either on or off.

A table below will summarize the results from the hydraulic analysis printouts.

1. **Printout No. 1**. Printout No. 1 is the normal hydraulic run without any fire flow or sprinkler demands. It is the normal "static" conditions. All existing supply points are operating normally. The two new PRV stations are assumed to be off. The printout shows the pressures at each node, flows in each pipe and incoming flows from each supply point. Pressure at elevation 180 (highest roof elevation, Node 330) is 103.7 psi.

2. **Printout No. 2**. Printout No. 2 assumes a flow of 750 gpm at Node 1840 at the proposed development. All existing supply points are operating normally. The two new PRV stations are assumed to be off. Pressure at Node 330 is 93.0 psi. It assumes the existing system operating normally with all supplies open and active. Under the assumed conditions, the pressure at the 180 elevation is slightly less than the desired 100 psi.

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3. **Printout No. 3.** Printout No. 3 assumes a flow of 750 gpm at the development with the two new PRV stations and the two meters from SPU's system on Military Road not operating. Pressure at Node 330 is 47.7 psi and the minimum pressure in zone 456 is –16.4 psi. This indicates that the flow requirements cannot be met if there is no supply available along Military Road.

4. **Printout No. 4.** Printout No. 4 assumes a flow of 750 gpm at the development with the two SPU's meters off but the two new PRV stations operating. The PRV's are set at a hydraulic gradient of 456 feet which corresponds to the desired zone 456 gradient. Pressure at the 180 roof elevation is 115.6 psi which is higher than it needs to be.

5. **Printout No. 5.** Printout No. 5 assumes the same conditions as number 4 except that the PRV's are set at a hydraulic gradient of 421 feet. Pressure at roof elevation 180 is 100.7 psi.

6. **Printout No. 6.** Printout No. 6 assumes a fire demand of 3,500 gpm at the development and the SPU meters along Military Road at South 125th and South 128th Street operating normally. The two new PRV stations are assumed to be off. Minimum pressure in zone 456 is about 16 psi which is slightly less than the desired 20 psi minimum pressure during a fire event. The location of this minimum pressure is at the upper elevation of the zone.

7. **Printout No. 7**. Printout No. 7 assumes the same conditions as number 6 except that the SPU's system in Military Road is off and the two new PRV stations are operating. Minimum pressure in the zone is about 20 psi because the PRV's are set at 421 feet which is slightly higher than the 400 feet provided by the SPU system in Military Road.

CONCLUSIONS

Under the assumed conditions of low incoming pressure from the Seattle Public Utilities system and the high demand in the zone, the existing system is able to provide adequate flow and pressure for the static conditions. See Printout no. 1. Minimum pressure in the zone is about 30 psi and pressure at the roof elevation of 180 feet is about 103.7 psi.

With the existing Seattle Public Utilities supply points operating and set at the minimum hydraulic gradient of 400 feet at the two meters on Military Road at S. 125th and S. 128th Streets, and a sprinkler condition flow of 750 gpm at the development, minimum pressure in the zone is adequate but the pressure at the roof elevation of 180 feet is about 93.0 psi. See Printout no. 2. However, this is

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based on the low 400' gradient being provided by SPU. Under normal conditions, a gradient of about 476 feet is provided which is about 33 psi higher which will be adequate at the roof elevation under normal supply conditions.

Assuming the two supply meters on Military Road are not operating, minimum [pressures in the zone fall well below the 20 psi required minimum under the sprinkler flow condition of 750 gpm. See Printout no. 3. This is due to the 4" and 6" pipe bottlenecks in the zone north of S. 122nd Street. With the Military Road supply system off, water supply for the south end of zone 456 must come from the meter on Des Moines Drive at S. 112th Street.

Because of the dead end nature of the SPU's supply pipe in Military Road and the possibility that this system may sometime be out of service, two new PRV stations are to be installed in conjunction with the proposed project. These two PRV stations will supply water to zone 456 from the District's higher zone 575. Location of the two PRV stations will be at Military Road at S. 122nd Street and Military Road at S. 128th Street.

With these two new PRV stations operating and set at a gradient of 456 feet and the SPU's supply points off, adequate minimum pressure of 37.7 psi is obtained in the zone. Pressure at the roof elevation of 180 feet is 115.6 psi which is higher than required. See Printout no. 4.

To obtain a roof pressure closer to the desired pressure of 100 psi, the PRV stations need only be set to about a gradient of 421 feet. See Printout no. 5.

Assuming a fire demand of 3500 gpm at the development, and the SPU's supply points operating, pressure in the zone falls below the 20 psi minimum. See Printout no. 6. With the new PRV stations operating and the SPU system off, pressure is about 19 psi. See Printout no. 7.

To ensure a minimum pressure of 20 psi in the zone under the fire flow condition of 3,500 gpm, the new PRV's should be set to a gradient of 425 feet which is approximately 2 psi higher than the 421 gradient.

Under the normal every day conditions, the Seattle Public Utilities's system will supply adequate water flow and pressure to this part of zone 456 under the static, sprinkler and fire flow conditions. This assumes that the SPU's system is providing water along Military Road at the normal every day gradient of about 476 feet.

With the new PRV stations set at a gradient of 425 feet, they will operate when the hydraulic gradient in the zone falls below 425 feet as in the case of SPU being out of service along Military Road.

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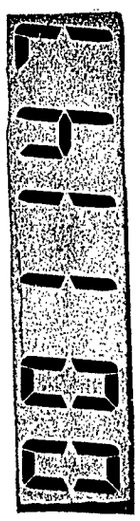

KING COUNTY WATER DISTRICT NO. 20
SABEY CORPORATION DEVELOPER EXTENSION
INS BUILDING NO. 9

SUMMARY OF HYDRAULIC RESULTS

Printout Number	Flow Condition	Flow At Node 1840	Supply From				PRV Settings	Minimum Pressure In Zone	Pressure At Sprinkler Elev 180	Comment
			SPU @ 125th St	SPU @ 128th St	New PRV 122nd St	New PRV 128th St				
		gpm	gpm	gpm	gpm	gpm	feet	psi	psi	
1	Static	0	0 open	0 open	0 off	0 off	PRV Off	30.3	103.7	OK
2	Spinkler	750	357 open	165 open	0 off	0 off	PRV Off	30.3	93.0	Less than 100 psi at sprinkler
3	Sprinkler	750	0 off	0 off	0 off	0 off	PRV Off	-16.4	47.7	No Good
4	Sprinkler	750	0 off	0 off	991 open	314 open	456	37.7	115.6	OK but higher than needed
5	Sprinkler	750	0 off	0 off	476 open	301 open	421	37.7	100.7	OK
6	Fire Flow	3500	2004 open	884 open	0 off	0 off	PRV Off	15.9	45.7	Less than 20 psi in zone
7	Fire Flow	3500	0 off	0 off	2191 open	1263 open	421	19.3	45.9	Close to 20 psi. See Note below

Note: The minimum pressure is at the top of the zone at Military Rd/128th Street. With PRV's set at 425 feet, pressure wil be over 20 psi.

a:/tap/25wd20/sabey de ins bldg 9 hydraulic summary

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File: D03-0128

35mm Drawing #7

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DISCARD

Scenario: Base
Steady State Analysis
Reservoir Report

Printout (1)

Label	Elevation (ft)	Zone	Inflow (gpm)	Calculated Hydraulic Grade (ft)	Location Description	Description
PR-1	448.00	0	-1,047.00	448.00	8th/112th P 10	PRV
PR-2	400.00	0	0.00 ←	400.00	Military/128th P 180	SPU
PR-3	420.00	0	0.00	420.00	8th/Aqua P 50	SPU
PR-6	425.00	0	-165.12	425.00	14th/112th P 420	SPU
PR-9	430.00	0	-918.88	430.00	DesMoines/112th P 1150	SPU
PR-13	400.00	0	0.00 ←	400.00	Military/125th P 1990	SPU
PRV-1	421.00	0	0.00 ←	421.00	Military/122nd P 360	New PRV
PRV-2	421.00	0	0.00 ←	421.00	Military/128th P 350	New PRV

↑ No flow from New PRV's or SPU on Military

Static Conditions

1. New PRV's off — No flow
2. SPU Supplies at Military/125th and Military/128 — No flow
3. Flow for This portion of Zone 456 Coming from DesMoines/112th and 14th/112th under static condition

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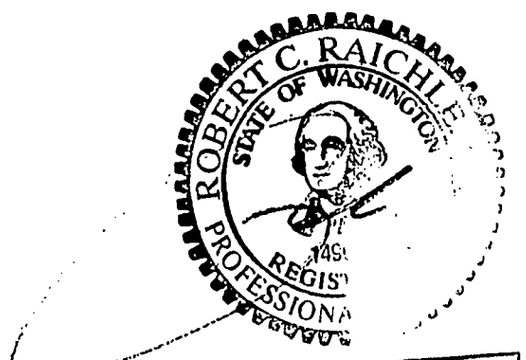
ENW ENGINEERS NORTHWEST, INC., P.S.
STRUCTURAL ENGINEERS ~ 6869 WOODLAWN AVE. N. E., SEATTLE, WA 98115 (206) 525~7560 FAX (206) 522~6698

FILE COPY

DEPARTMENT OF HOMELAND SECURITY
SEATTLE DISTRICT OFFICE

12500 Tukwila International Boulevard
Seattle, Washington

STRUCTURAL CALCULATIONS
FOR NEW OFFICE BUILDING



RECEIVED
CITY OF TUKWILA
APR 3 0 2003
PERMIT CENTER

April 29, 2003
ENW Project No. 02110000

CODE: 1997 UNIFORM BUILDING CODE
SEISMIC: ZONE 3, Soil Type S_D
WIND: 80 mph, Exposure B

D03-128

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SEC 03-128

Department of Homeland Security

Seattle District Office
12500 Tukwila International Blvd
Seattle, Washington

ENW PROJECT # 02110

STRUCTURAL CALCULATIONS

ITEM	SHEETS
Loads/General	G-1 thru G-20
Lateral	L-1 thru L-78
Level P2 & P1 P.T.	FLR-1 thru FLR-46
First Floor P.T.	FLR-47 thru FLR-101
Second Floor P.T.	FLR-102 thru FLR-142
Third Floor P.T.	FLR-143 thru FLR-183
Fourth Floor P.T.	FLR-184 thru FLR-225
Roof P.T.	RF-1 thru RF-44
Columns	C-1 thru C-7
Walls	W-1 thru W-9
Foundations	FND-1 thru FND-34
Garden Walls	GW-1 thru GW-11
Entry Canopy	CAN-1 thru CAN-9

ENGINEERS - NORTHWEST, INC. P.S.
6869 WOODLAWN AVE. N.E. (Suite 205)
SEATTLE, WA. 98115
Ph. (206) 525 - 7560
Fax (206) 522 - 6698

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SCANNED

ENGINEERS-NORTHWEST, INC. P.S.
6869 WOODLAWN AVE N.E., SUITE 205
SEATTLE, WA 98115

Project Name: DHS Office Building
Project No.: 02110000

Live Loads

Roof: 25 psf, snow (+ Drift per UBC)

Floors:	Load (psf)	Description	LL Reduction? Y or N
	100.0	Exit facilities/ Conference Rooms	N
	80.0	Office	Y
	150.0	Storage	N
	50.0	Parking	

Dead Loads

Roof	Dead Loads:	Roofing, Insulation	8.0 psf
		Deck	106.0
		Joists, Purlins	
		Beams	
		Ceiling	2.0
		Fireproofing	
		Sprinklers	3.0
		Misc, Mech, etc.	4.0
		Total	123.0 psf DL

Floor	Dead Loads:	Flooring, Topping	6.0 psf
4th, 3rd & 2nd		Deck	106.0
		Joists, Purlins	
		Beams	
		Ceiling	2.0
		Fireproofing	
		Sprinklers	3.0
		Misc, Mech, etc.	4.0
		Subtotal	121.0 psf DL
		Partitions	20.0
		Total	141.0 psf DL

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Project Name: DHS Office Building
Project No.: 02110000

Dead Loads

1st Floor	Dead Loads:	Flooring, Topping	6.0 psf
		Deck	106.0
		Joists, Purlins	
		Beams	
		Ceiling	
		Fireproofing	
		Sprinklers	3.0
		Misc, Mech, etc.	4.0
		Insulation	4.0
		Subtotal	123.0 psf DL
		Partitions	20.0
		Total	143.0 psf DL
Parking	Dead Loads:	Flooring, Topping	psf
		Deck	106.0
		Joists, Purlins	
		Beams	
		Ceiling	
		Fireproofing	
		Sprinklers	3.0
		Misc, Mech, etc.	4.0
		Subtotal	113.0 psf DL
		Partitions	
		Total	113.0 psf DL
____	Floor Dead Loads:	Flooring, Topping	psf
		Deck	
		Joists, Purlins	
		Beams	
		Ceiling	
		Fireproofing	
		Sprinklers	
		Misc, Mech, etc.	
		Subtotal	0.0 psf DL
		Partitions	
		Total	0.0 psf DL

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ENW ENGINEERS NORTHWEST, INC., P.S. ~ STRUCTURAL ENGINEERS

6869 WOODLAWN AVE. N. E., #205, SEATTLE, WA 98115 (206) 525-7560 FAX (206) 522-6698

PROJECT # 02110 PROJECT INS - TUKWILA, WA DATE 1/20/03

SUBJECT LOADS SHEET G3 OF

BY TDM

WALL DL

CURTAIN WALL GLASS/ALUM SYSTEM	10 PSF
PRECAST CONCRETE (6")	75 PSF
GRANITE PANEL SYSTEM	45 PSF

FIRST FLOOR 15' FLOOR TO FLOOR

12' HIGH CURTAIN WALL

$R_1 = (12')(10PSF) = 120$ PLF

SECOND FLOOR

6' GRANITE SYSTEM & 6' WINDOW WALL

$R_2 = (6')(45PSF) + (6')(10PSF) = 330$ PLF

THIRD FLOOR/FOURTH FLOOR

6' PRECAST + 6' WINDOW WALL

$R_3 = R_4 = (6')(75PSF) + (6')(10PSF) = 510$ PLF

ROOF

6' PRECAST

$R_5 = (6')(75 PSF) = 450$ PLF

	7.5'	15'	22.5'	27.5'	30'	37.5'
R_1	.90k	1.80k	2.70k	3.30k	3.60k	—
R_2	2.48k	4.95k	7.43k	9.08k	9.90k	—
R_3	3.83k	7.65k	11.48k	14.03k	15.30k	—
R_4	3.83k	7.65k	11.48k	14.03k	15.30k	19.13k
R_5	3.38k	6.75k	10.13k	12.38k	13.50k	16.88k

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DCI-15

ENW ENGINEERS NORTHWEST, INC., P.S. ~ STRUCTURAL ENGINEERS

6869 WOODLAWN AVE. N. E., #205, SEATTLE, WA 98115 (206) 525~7560 FAX (206) 522~6698

PROJECT # 02110 PROJECT INSTUKULA DATE 1/20/03

SUBJECT _____ SHEET G4 OF _____

BY TDM

MECHANICAL SCREEN

4" PRECAST CONCRETE 14' H × 435' 480 L.F.
(50 PSF)

20 PSF 285 .29
W = (50 PSF)(14') = 700 PLF = .7 KLF

W = (.7 KLF)(480') = 336 K
.29 435' 13+

MECH UNITS

3 × (20K + 30K) = 150K
↑ UNIT ↑ CONIC CURB

ELEVATOR PENT HOUSE & MACHINERY

20K EQUIPMENT

ROOF
(.02 KSF)(45')(48') = 43.2K

WALLS
(.015 KSF)(2)(45'+48')(20') = 55.8K

TOTAL : 336K 134
150
43.2
55.8
585.0K 285K/18 = 21.3

P = 585K/18 = 32.5K DL

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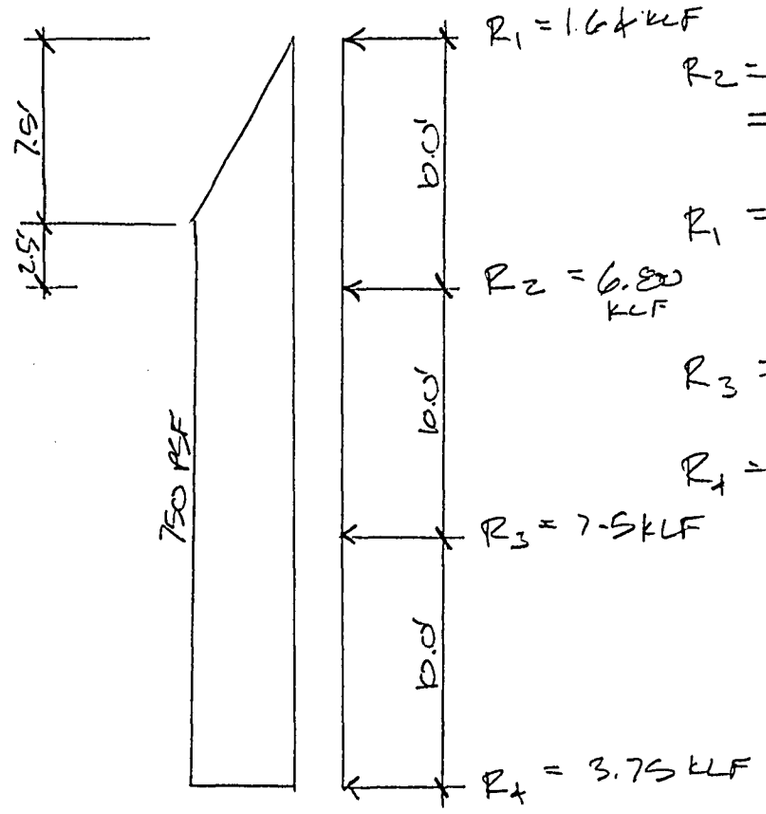
PROJECT # 02110 PROJECT INS TUKWILA DATE 2/10/03

SUBJECT LOADS SHEET G5 OF

BY TDA

SOIL LOADS ON WALL



$R_1 = 1.64\ KLF$

$R_2 = \frac{(750\ PSF)(7.5')^2}{3(10')} + \frac{(750\ PSF)(2.5')(8.}{10'}$

$= \pm(750\ PSF)(5') = 6797\ PLF$

$R_1 = \frac{\pm(750\ PSF)(7.5')\left(\frac{2.5'}{3}+2.5'\right)}{10'} + \frac{(750\ PSF)(2.5')^2}{2(10')} = 1641\ PLF$

$R_3 = (750\ PSF)(10') = 7500\ PLF$

$R_4 = (750\ PSF)(5') = 3750\ PLF$

	15'	30'
R_1	24.6 K	49.2 K
R_2	102.0 K	204.0 K
R_3	112.5 K	225 K
R_4	56.3 K	112.5 K

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ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

REINFORCING STEEL TENSION SPLICE LENGTHS (inches)[1,2,3&4]

GRADE 60 — UNCOATED BARS — NORMAL WEIGHT CONCRETE
per 1997 UBC — Sec. 1912.2.1, 1912.2.3 , 1912.2.4 , 1912.14 & 1912.15
per ACI 318-95 & 99 — Sec. 12.2.1, 12.2.3 , 12.2.4 , 12.14 & 12.15

Fy (ksi) = 60 — NORMAL WEIGHT CONCRETE? (Y or N) Y
F'c (ksi) = 3 — EPOXY COATED BARS? (Y or N) N

Lap Class "A":- As = 2*As (required) & max. 50% bars spliced. Lap Class "B" = ALL OTHER

Lap lengths (inches)							
Bar Size	Lap Class	Top bars[4] Category 1	Top bars[4] Category 2	Top bars[4] Category 3	Other bars[4] Category 1	Other bars[4] Category 2	Other bars[4] Category 3
#3	B	42	28	17	33	22	16
#4	B	56	38	23	43	29	18
#5	B	70	47	28	54	36	22
#6	B	84	56	34	65	43	26
#7	B	122	81	49	94	63	38
#8	B	139	93	56	107	72	43
#9	B	157	105	63	121	81	49
#10	B	177	118	71	136	91	55
#11	B	196	131	79	151	101	61

Category				
Structural Element	Minimum Clear Concrete Cover*	Minimum Center to Center Bar Spacing* >=2db <3db	>=3db <5db	>=5db
Beams & Columns w/ code ties	>=1db,<1.5db	2	2	2
	>=1.5db,<2db	2	2	3
	>=2db	2	2	3
Other	>=1db,<1.5db	1	1	1
	>=1.5db,<2db	1	2	2
	>=2db	1	2	3

* db = bar diameter

NOTES : - 1.) Categories 1 thru 3 which depend on the type of structural element, concrete cover, and the center to center spacing of the bars are defined above right :-

2.) Lap splice lengths are multiples of tension development lengths. Class A = 1.0*ld & Class B = 1.3*ld (ACI 12.15.1). Values for ld for bars in beams or columns are based on transverse reinforcement meeting requirements for stirrups in ACI 11.5.4 & 11.5.5.3 or meeting tie requirements in ACI 7.10.5: & are based on minimum cover specified in ACI 7.7.1.

3.) Conditions which require Category 1 lap splice lengths (shaded regions) should be avoided if at all possible for the larger bar sizes. These inordinately long lengths present possible constructability problems due to placing, congestion, etc. Options available in trying to avoid Category 1 conditions include:

a.) Increasing the concrete cover to more than 1.5 bar diameters and increasing the bar center-to-center spacing to more than three diameters.

b.) Utilizing the Atr allowance in ACI 12.2.3.1(b) for beams or columns. Note that if ties or stirrups meet the minimum Atr requirement, Category 1 lengths are reduced to Category 2 lengths.

4.) Top bars are horizontal bars with more than 12 in. of concrete cast below the bars.

5.) @ Category = 1 2 3
(c+Ktr)/db = 1 1.5 2.5

Table R12.15.2 - Tension lap splices

As provided / As required	Maxumum percent of As spliced within required lap length: 50	100
Equal to or greater than 2	Class A	Class B
Less than 2	Class B	Class B

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ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

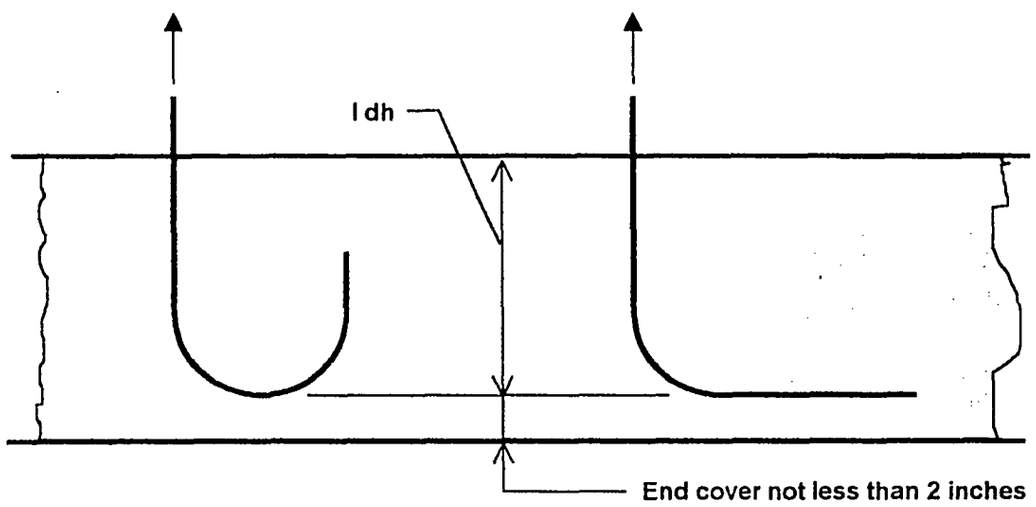
Tension Embedment of Standard REINFORCING STEEL HOOKS (inches)

#11 Bars and smaller

per ACI 318-95 Sec 12.5
per 97 UBC Sec 1912.5

	Input	
Concrete strength F'c =	3	ksi
Bar yield strength Fy =	60	ksi
Is concrete cover less than 2-1/2" ? (Y or N) =	N	(Normal to plane of hook)
Is concrete cover less than 2" ? (Y or N) =	N	(Beyond end of 90 degree hook)
Is hook enclosed within ties ? (Y or N) =	N	(Along the full development length spaced<=3db)
As (required)/As (provided) =	1	
Is concrete lightweight ? (Y or N) =	N	
Are bars epoxy coated ? (Y or N) =	N	

Bar Size	l dh
#3	6 in.
#4	8 in.
#5	10 in.
#6	12 in.
#7	14 in.
#8	16 in.
#9	18 in.
#10	20 in.
#11	22 in.



Reinforcing Tension Values with Reduced Hook Embedment

by ratioing actual embedment to required embedment with a .50 lower limit.

	Input		
Bar Size =	5		
Actual Embedment =	6	in.	
	Output		
Required Embedment =	10	in. (for full value)	
Ratio =	0.60	actual/required	
As =	0.31	$in.^2$	
Reduced Fy =	36	ksi	(ultimate)
Reduced Tu =	10.0	kips	(ultimate) .9 Fy As
Reduced Ts = Tu/1.4 =	7.14	kips	(working)

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ENGINEERS-NORTHWEST,INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

REINFORCING TENSION DEVELOPMENT LENGTHS (in.)

1997 UBC Section 1912.2 & ACI 318-95 & 99 Section 12.2

Input : -	fy =	60	ksi
	f'c =	3	ksi <= 10 ksi
Are bars "top bars" ? (Yor N) =		N	Top bars have 12 in. min. concrete cast below these bars
Are bars "epoxy coated" ? (Yor N) =		N	
Is concrete normal weight concrete ? (Yor N) =		Y	

Constants : -

α = 1.0 Sec. 1912.2.4
β = 1.0 Sec. 1912.2.4
γ = 0.8 for #6 and smaller, 1.0 for #7 and larger Sec. 1912.2.4
λ = 1.0 Sec. 1912.2.4
ς = 1/25 for (#6 & smaller)
ς = 1/20 for (#7 & larger)

NOTE:- Center to center bar spacing must be at least 3db and clear cover at least 1.5db.

Equations : - $ld = \varsigma\alpha\beta\lambda\ fy\ db/(f'c)^{1/2}$ min. Sec. 1912.2.2

$ld = 3\alpha\beta\gamma\lambda\ fy\ db^2/(40(f'c)^{1/2}(c+Ktr/db))$ min. $c+Ktr/db = 1.5$ Sec. 1912.2.3

ld =12 in. min. Sec. 1912.2.1

REINFORCING TENSION DEVELOPMENT LENGTHS (inches)

Reinforcing size #	Minimum ctr. to ctr. Spacing	Minimum clear cover	Required straight Embedment	Required straight Embedment
3	1 1/8	0.375	44db	17in.
4	1 1/2	0.500	44db	22in.
5	1 7/8	0.625	44db	28in.
6	2 1/4	0.750	44db	33in.
7	2 5/8	0.875	55db	48in.
8	3	1.000	55db	55in.
9	3 3/8	1.128	55db	62in.
10	3 7/8	1.270	55db	70in.
11	4 1/4	1.410	55db	78in.

REINFORCING COMPRESSION DEVELOPMENT LENGTHS (inches) Sec. 1912.3

Reinforcing size #	Minimum ctr. to ctr. Spacing	Minimum clear cover	Required straight Embedment	Required straight Embedment
3	1 1/8	0.375	22db	9in.
4	1 1/2	0.500	22db	11in.
5	1 7/8	0.625	22db	14in.
6	2 1/4	0.750	22db	17in.
7	2 5/8	0.875	22db	20in.
8	3	1.000	22db	22in.
9	3 3/8	1.128	22db	25in.
10	3 7/8	1.270	22db	28in.
11	4 1/4	1.410	22db	31in.

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ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

REINFORCING STEEL TENSION SPLICE LENGTHS (inches)[1,2,3&4]

GRADE 60 UNCOATED BARS NORMAL WEIGHT CONCRETE
per 1997 UBC Sec. 1912.2.1, 1912.2.3 , 1912.2.4 , 1912.14 & 1912.15
per ACI 318-95 & 99 Sec. 12.2.1, 12.2.3 , 12.2.4 , 12.14 & 12.15

Fy (ksi) = 60 NORMAL WEIGHT CONCRETE? (Y or N) Y
F'c (ksi) = 4 EPOXY COATED BARS? (Y or N) N
Lap Class "A":- As = 2*As (required) & max. 50% bars spliced. Lap Class "B" = ALL OTHER

Lap lengths (inches)								
Bar Size	Lap Class	Top bars[4] Category 1	Top bars[4] Category 2	Top bars[4] Category 3	Other bars[4] Category 1	Other bars[4] Category 2	Other bars[4] Category 3
#3	B	37	25	16	28	19	16
#4	B	49	33	20	37	25	16
#5	B	61	41	25	47	31	19
#6	B	73	49	29	56	37	23
#7	B	106	71	43	81	54	33
#8	B	121	81	49	93	62	37
#9	B	136	91	55	105	70	42
#10	B	153	102	62	118	79	47
#11	B	170	114	68	131	87	53

Category				
Structural Element	Minimum Clear Concrete Cover*	Minimum Center to Center Bar Spacing* >=2db <3db	>=3db <5db	>=5db
Beams & Columns w/ code ties	>=1db,<1.5db	2	2	2
	>=1.5db,<2db	2	2	3
	>=2db	2	2	3
Other	>=1db,<1.5db	1	1	1
	>=1.5db,<2db	1	2	2
	>=2db	1	2	3

* db = bar diameter

NOTES : - 1.) Categories 1 thru 3 which depend on the type of structural element, concrete cover, and the center to center spacing of the bars are defined above right :-

2.) Lap splice lengths are multiples of tension development lengths. Class A = 1.0*ld & Class B = 1.3*ld (ACI 12.15.1). Values for ld for bars in beams or columns are based on transverse reinforcement meeting requirements for stirrups in ACI 11.5.4 & 11.5.5.3 or meeting tie requirements in ACI 7.10.5: & are based on minimum cover specified in ACI 7.7.1.

3.) Conditions which require Category 1 lap splice lengths (shaded regions) should be avoided if at all possible for the larger bar sizes. These inordinately long lengths present possible constructability problems due to placing, congestion, etc. Options available in trying to avoid Category 1 conditions include:
a.) Increasing the concrete cover to more than 1.5 bar diameters and increasing the bar center-to-center spacing to more than three diameters.
b.) Utilizing the Atr allowance in ACI 12.2.3.1(b) for beams or columns. Note that if ties or stirrups meet the minimum Atr requirement, Category 1 lengths are reduced to Category 2 lengths.

4.) Top bars are horizontal bars with more than 12 in. of concrete cast below the bars.

5.) @ Category = 1 2 3
(c+Ktr)/db = 1 1.5 2.5

Table R12.15.2 - Tension lap splices

As provided / As required	Maxumum percent of As spliced within required lap length: 50	100
Equal to or greater than 2	Class A	Class B
Less than 2	Class B	Class B

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ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

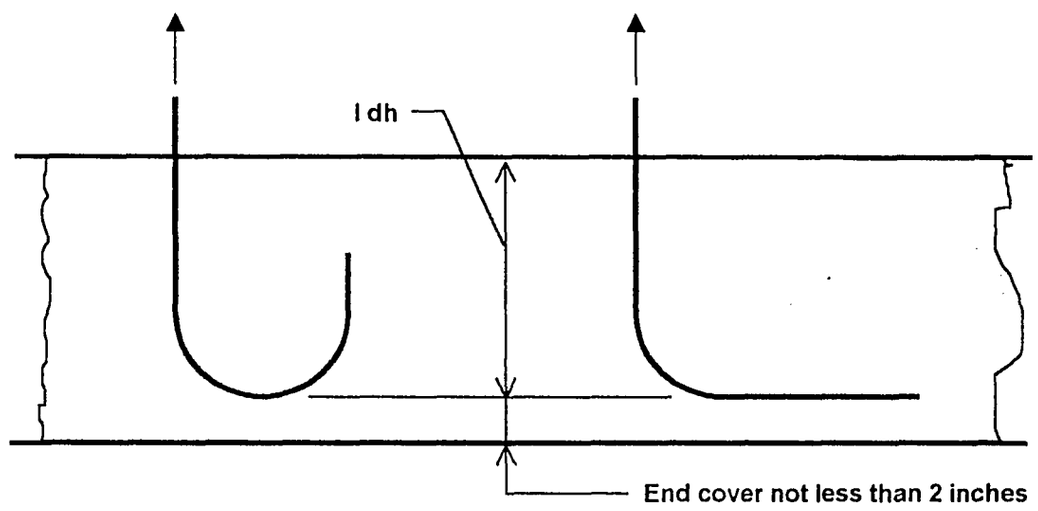
Tension Embedment of Standard REINFORCING STEEL HOOKS (inches)

#11 Bars and smaller

per ACI 318-95 Sec 12.5
per 97 UBC Sec 1912.5

	Input	
Concrete strength F'c =	4	ksi
Bar yield strength Fy =	60	ksi
Is concrete cover less than 2-1/2" ? (Y or N) =	N	(Normal to plane of hook)
Is concrete cover less than 2" ? (Y or N) =	N	(Beyond end of 90 degree hook)
Is hook enclosed within ties ? (Y or N) =	N	(Along the full development length spaced<=3db)
As (required)/As (provided) =	1	
Is concrete lightweight ? (Y or N) =	N	
Are bars epoxy coated ? (Y or N) =	N	

Bar Size	l dh
#3	6 in.
#4	7 in.
#5	9 in.
#6	10 in.
#7	12 in.
#8	14 in.
#9	15 in.
#10	17 in.
#11	19 in.



Reinforcing Tension Values with Reduced Hook Embedment

by ratioing actual embedment to required embedment with a .50 lower limit.

	Input			
Bar Size =	5			
Actual Embedment =	6	in.		
	Output			
Required Embedment =	9	in. (for full value)		
Ratio =	0.67	actual/required		
As =	0.31	$in.^2$		
Reduced Fy =	40	ksi	(ultimate)	
Reduced Tu =	11.1	kips	(ultimate)	.9 Fy As
Reduced Ts = Tu/1.4 =	7.93	kips	(working)	

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ENGINEERS-NORTHWEST,INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

REINFORCING TENSION DEVELOPMENT LENGTHS (in.)

1997 UBC Section 1912.2 & ACI 318-95 & 99 Section 12.2

Input : -	fy =	60	ksi
	f'c =	4	ksi <= 10 ksi
Are bars "top bars" ? (Yor N) =		N	Top bars have 12 in. min. concrete cast below these bars
Are bars "epoxy coated" ? (Yor N) =		N	
Is concrete normal weight concrete ? (Yor N) =		Y	

Constants : -

α = 1.0 Sec. 1912.2.4
β = 1.0 Sec. 1912.2.4
γ = 0.8 for #6 and smaller, 1.0 for #7 and larger Sec. 1912.2.4
λ = 1.0 Sec. 1912.2.4
ς = 1/25 for (#6 & smaller)
ς = 1/20 for (#7 & larger)

NOTE:- Center to center bar spacing must be at least 3db and clear cover at least 1.5db.

Equations : - $ld = \varsigma\alpha\beta\lambda\ fy\ db/(f'c)^{1/2}$ min. Sec. 1912.2.2

$ld = 3\alpha\beta\gamma\lambda\ fy\ db^2/(40(f'c)^{1/2}(c+Ktr/db))$ min. $c+Ktr/db = 1.5$ Sec. 1912.2.3

ld = 12 in. min. Sec. 1912.2.1

REINFORCING TENSION DEVELOPMENT LENGTHS (inches)

Reinforcing size #	Minimum ctr. to ctr. Spacing	Minimum clear cover	Required straight Embedment	Required straight Embedment
3	1 1/8	0.375	38db	15in.
4	1 1/2	0.500	38db	19in.
5	1 7/8	0.625	38db	24in.
6	2 1/4	0.750	38db	29in.
7	2 5/8	0.875	47db	42in.
8	3	1.000	47db	48in.
9	3 3/8	1.128	47db	54in.
10	3 7/8	1.270	47db	61in.
11	4 1/4	1.410	47db	67in.

REINFORCING COMPRESSION DEVELOPMENT LENGTHS (inches) Sec. 1912.3

Reinforcing size #	Minimum ctr. to ctr. Spacing	Minimum clear cover	Required straight Embedment	Required straight Embedment
3	1 1/8	0.375	19db	8in.
4	1 1/2	0.500	19db	10in.
5	1 7/8	0.625	19db	12in.
6	2 1/4	0.750	19db	15in.
7	2 5/8	0.875	19db	17in.
8	3	1.000	19db	19in.
9	3 3/8	1.128	19db	22in.
10	3 7/8	1.270	19db	25in.
11	4 1/4	1.410	19db	27in.

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ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

REINFORCING STEEL TENSION SPLICE LENGTHS (inches)[1,2,3&4]

GRADE 60 **UNCOATED BARS** **NORMAL WEIGHT CONCRETE**
per 1997 UBC Sec. 1912.2.1, 1912.2.3 , 1912.2.4 , 1912.14 & 1912.15
per ACI 318-95 & 99 Sec. 12.2.1, 12.2.3 , 12.2.4 , 12.14 & 12.15

Fy (ksi) = 60 NORMAL WEIGHT CONCRETE? (Y or N) Y
F'c (ksi) = 5 EPOXY COATED BARS? (Y or N) N

Lap Class "A":- As = 2*As (required) & max. 50% bars spliced. Lap Class "B" = ALL OTHER

Lap lengths (inches)								
Bar Size	Lap Class	Top bars[4] Category 1	Top bars[4] Category 2	Top bars[4] Category 3	Other bars[4] Category 1	Other bars[4] Category 2	Other bars[4] Category 3
#3	B	33	22	16	25	17	16
#4	B	44	29	18	34	23	16
#5	B	54	36	22	42	28	17
#6	B	65	44	26	50	34	20
#7	B	95	63	38	73	49	29
#8	B	108	72	44	83	56	34
#9	B	122	81	49	94	63	38
#10	B	137	92	55	106	71	43
#11	B	152	102	61	117	78	47

Category				
Structural Element	Minimum Clear Concrete Cover*	Minimum Center to Center Bar Spacing* >=2db <3db	>=3db <5db	>=5db
Beams & Columns w/ code ties	>=1db,<1.5db	2	2	2
	>=1.5db,<2db	2	2	3
	>=2db	2	2	3
Other	>=1db,<1.5db	1	1	1
	>=1.5db,<2db	1	2	2
	>=2db	1	2	3

* db = bar diameter

NOTES : - 1.) Categories 1 thru 3 which depend on the type of structural element, concrete cover, and the center to center spacing of the bars are defined above right :-

2.) Lap splice lengths are multiples of tension development lengths. Class A = 1.0*ld & Class B = 1.3*ld (ACI 12.15.1). Values for ld for bars in beams or columns are based on transverse reinforcement meeting requirements for stirrups in ACI 11.5.4 & 11.5.5.3 or meeting tie requirements in ACI 7.10.5: & are based on minimum cover specified in ACI 7.7.1.

3.) Conditions which require Category 1 lap splice lengths (shaded regions) should be avoided if at all possible for the larger bar sizes. These inordinately long lengths present possible constructability problems due to placing, congestion, etc. Options available in trying to avoid Category 1 conditions include:

a.) Increasing the concrete cover to more than 1.5 bar diameters and increasing the bar center-to-center spacing to more than three diameters.

b.) Utilizing the Atr allowance in ACI 12.2.3.1(b) for beams or columns. Note that if ties or stirrups meet the minimum Atr requirement, Category 1 lengths are reduced to Category 2 lengths.

4.) Top bars are horizontal bars with more than 12 in. of concrete cast below the bars.

5.) @ Category = 1 2 3
(c+Ktr)/db = 1 1.5 2.5

Table R12.15.2 - Tension lap splices

As provided / As required	Maxumum percent of As spliced within required lap length	
	50	100
Equal to or greater than 2	Class A	Class B
Less than 2	Class B	Class B

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ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

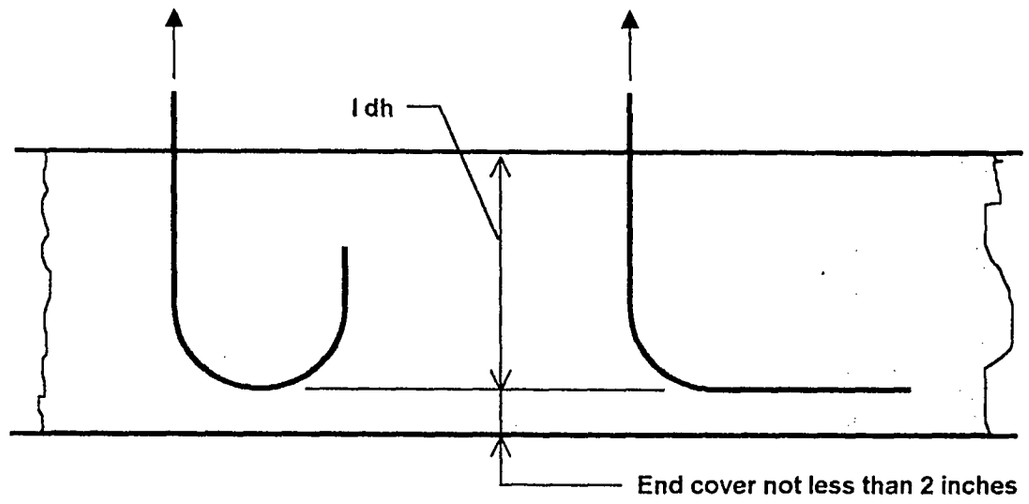
Tension Embedment of Standard REINFORCING STEEL HOOKS (inches)

#11 Bars and smaller

per ACI 318-95 Sec 12.5
per 97 UBC Sec 1912.5

	Input	
Concrete strength F'c =	5	ksi
Bar yield strength Fy =	60	ksi
Is concrete cover less than 2-1/2" ? (Y or N) =	N	(Normal to plane of hook)
Is concrete cover less than 2" ? (Y or N) =	N	(Beyond end of 90 degree hook)
Is hook enclosed within ties ? (Y or N) =	N	(Along the full development length spaced<=3db)
As (required)/As (provided) =	1	
Is concrete lightweight ? (Y or N) =	N	
Are bars epoxy coated ? (Y or N) =	N	

Bar Size	l dh
#3	6 in.
#4	6 in.
#5	8 in.
#6	9 in.
#7	11 in.
#8	12 in.
#9	14 in.
#10	16 in.
#11	17 in.



Reinforcing Tension Values with Reduced Hook Embedment

by ratioing actual embedment to required embedment with a .50 lower limit.

	Input		
Bar Size =	5		
Actual Embedment =	6	in.	
	Output		
Required Embedment =	8	in. (for full value)	
Ratio =	0.75	actual/required	
As =	0.31	$in.^2$	
Reduced Fy =	45	ksi	(ultimate)
Reduced Tu =	12.5	kips	(ultimate) .9 Fy As
Reduced Ts = Tu/1.4 =	8.93	kips	(working)

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ENGINEERS-NORTHWEST,INC.P.S.
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REINFORCING TENSION DEVELOPMENT LENGTHS (in.)

1997 UBC Section 1912.2 & ACI 318-95 & 99 Section 12.2

Input : -	fy =	60	ksi
	f'c =	5	ksi <= 10 ksi
Are bars "top bars" ? (Yor N) =		N	Top bars have 12 in. min. concrete cast below these bars
Are bars "epoxy coated" ? (Yor N) =		N	
Is concrete normal weight concrete ? (Yor N) =		Y	

Constants : -

α = 1.0 Sec. 1912.2.4
β = 1.0 Sec. 1912.2.4
γ = 0.8 for #6 and smaller, 1.0 for #7 and larger Sec. 1912.2.4
λ = 1.0 Sec. 1912.2.4
ς = 1/25 for (#6 & smaller)
ς = 1/20 for (#7 & larger)

NOTE:- Center to center bar spacing must be at least 3db and clear cover at least 1.5db.

Equations : - $ld = \varsigma\alpha\beta\lambda\ fy\ db/(f'c)^{1/2}$ min. Sec. 1912.2.2

$ld = 3\alpha\beta\gamma\lambda\ fy\ db^2/(40(f'c)^{1/2}(c+Ktr/db))$ min. $c+Ktr/db = 1.5$ Sec. 1912.2.3

ld =12 in. min. Sec. 1912.2.1

REINFORCING TENSION DEVELOPMENT LENGTHS (inches)

Reinforcing size #	Minimum ctr. to ctr. Spacing	Minimum clear cover	Required straight Embedment	Required straight Embedment
3	1 1/8	0.375	34db	13in.
4	1 1/2	0.500	34db	17in.
5	1 7/8	0.625	34db	22in.
6	2 1/4	0.750	34db	26in.
7	2 5/8	0.875	42db	38in.
8	3	1.000	42db	43in.
9	3 3/8	1.128	42db	48in.
10	3 7/8	1.270	42db	54in.
11	4 1/4	1.410	42db	60in.

REINFORCING COMPRESSION DEVELOPMENT LENGTHS (inches) Sec. 1912.3

Reinforcing size #	Minimum ctr. to ctr. Spacing	Minimum clear cover	Required straight Embedment	Required straight Embedment
3	1 1/8	0.375	18db	8in.
4	1 1/2	0.500	18db	9in.
5	1 7/8	0.625	18db	12in.
6	2 1/4	0.750	18db	14in.
7	2 5/8	0.875	18db	16in.
8	3	1.000	18db	18in.
9	3 3/8	1.128	18db	21in.
10	3 7/8	1.270	18db	23in.
11	4 1/4	1.410	18db	26in.

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REINFORCING STEEL TENSION SPLICE LENGTHS (inches)[1,2,3&4]

GRADE 60 UNCOATED BARS NORMAL WEIGHT CONCRETE
per 1997 UBC Sec. 1912.2.1, 1912.2.3 , 1912.2.4 , 1912.14 & 1912.15
per ACI 318-95 & 99 Sec. 12.2.1, 12.2.3 , 12.2.4 , 12.14 & 12.15

Fy (ksi) = 60 NORMAL WEIGHT CONCRETE? (Y or N) Y
F'c (ksi) = 6 EPOXY COATED BARS? (Y or N) N
Lap Class "A":- As = 2*As (required) & max. 50% bars spliced. Lap Class "B" = ALL OTHER

Lap lengths (inches)								
Bar Size	Lap Class	Top bars[4] Category 1	Top bars[4] Category 2	Top bars[4] Category 3	Other bars[4] Category 1	Other bars[4] Category 2	Other bars[4] Category 3
#3	B	30	20	16	23	16	16
#4	B	40	27	16	31	21	16
#5	B	50	33	20	38	26	16
#6	B	59	40	24	46	31	19
#7	B	86	58	35	67	45	27
#8	B	99	66	40	76	51	31
#9	B	111	74	45	86	57	35
#10	B	125	84	50	96	64	39
#11	B	139	93	56	107	71	43

Category				
Structural Element	Minimum Clear Concrete Cover*	Minimum Center to Center Bar Spacing* >=2db <3db	>=3db <5db	>=5db
Beams & Columns w/ code ties	>=1db,<1.5db	2	2	2
	>=1.5db,<2db	2	2	3
	>=2db	2	2	3
Other	>=1db,<1.5db	1	1	1
	>=1.5db,<2db	1	2	2
	>=2db	1	2	3

* db = bar diameter

NOTES : - 1.) Categories 1 thru 3 which depend on the type of structural element, concrete cover, and the center to center spacing of the bars are defined above right :-

2.) Lap splice lengths are multiples of tension development lengths. Class A = 1.0*ld & Class B = 1.3*ld (ACI 12.15.1). Values for ld for bars in beams or columns are based on transverse reinforcement meeting requirements for stirrups in ACI 11.5.4 & 11.5.5.3 or meeting tie requirements in ACI 7.10.5: & are based on minimum cover specified in ACI 7.7.1.

3.) Conditions which require Category 1 lap splice lengths (shaded regions) should be avoided if at all possible for the larger bar sizes. These inordinately long lengths present possible constructability problems due to placing, congestion, etc. Options available in trying to avoid Category 1 conditions include:

a.) Increasing the concrete cover to more than 1.5 bar diameters and increasing the bar center-to-center spacing to more than three diameters.

b.) Utilizing the Atr allowance in ACI 12.2.3.1(b) for beams or columns. Note that if ties or stirrups meet the minimum Atr requirement, Category 1 lengths are reduced to Category 2 lengths.

4.) Top bars are horizontal bars with more than 12 in. of concrete cast below the bars.

5.) @ Category = 1 2 3
(c+Ktr)/db = 1 1.5 2.5

Table R12.15.2 - Tension lap splices

As provided / As required	Maxumum percent of As spliced within required lap length	
	50	100
Equal to or greater than 2	Class A	Class B
Less than 2	Class B	Class B

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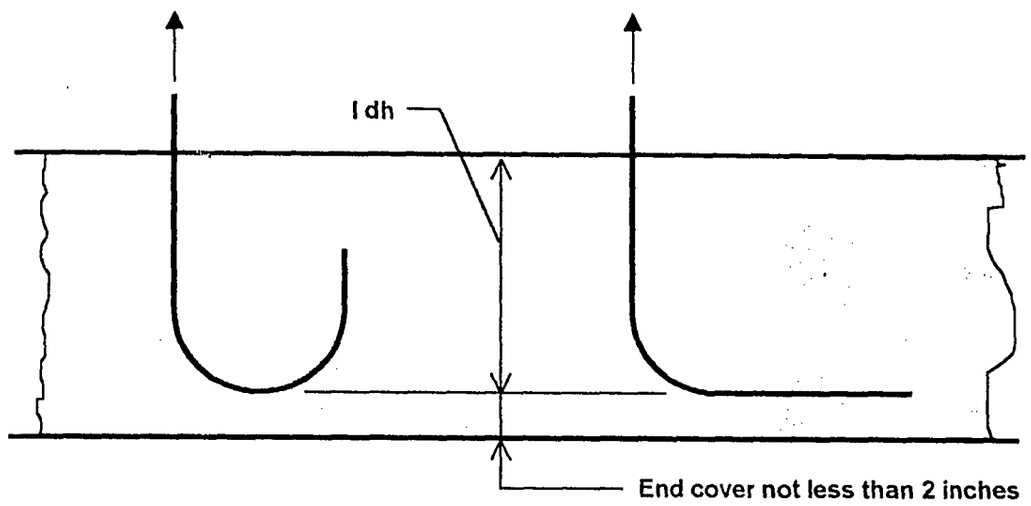
Tension Embedment of Standard REINFORCING STEEL HOOKS (inches)

#11 Bars and smaller

per ACI 318-95 Sec 12.5
per 97 UBC Sec 1912.5

	Input	
Concrete strength F'c =	6	ksi
Bar yield strength Fy =	60	ksi
Is concrete cover less than 2-1/2" ? (Y or N) =	N	(Normal to plane of hook)
Is concrete cover less than 2" ? (Y or N) =	N	(Beyond end of 90 degree hook)
Is hook enclosed within ties ? (Y or N) =	N	(Along the full development length spaced<=3db)
As (required)/As (provided) =	1	
Is concrete lightweight ? (Y or N) =	N	
Are bars epoxy coated ? (Y or N) =	N	

Bar Size	l dh
#3	6 in.
#4	6 in.
#5	7 in.
#6	9 in.
#7	10 in.
#8	11 in.
#9	13 in.
#10	14 in.
#11	16 in.



Reinforcing Tension Values with Reduced Hook Embedment

by ratioing actual embedment to required embedment with a .50 lower limit.

	Input		
Bar Size =	5		
Actual Embedment =	6	in.	
	Output		
Required Embedment =	7	in. (for full value)	
Ratio =	0.86	actual/required	
As =	0.31	$in.^2$	
Reduced Fy =	51.43	ksi	(ultimate)
Reduced Tu =	14.3	kips	(ultimate) .9 Fy As
Reduced Ts = Tu/1.4 =	10.21	kips	(working)

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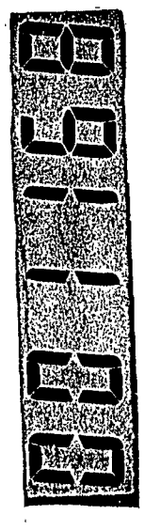

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REINFORCING TENSION DEVELOPMENT LENGTHS (in.)

1997 UBC Section 1912.2 & ACI 318-95 & 99 Section 12.2

Input : -	fy =	60	ksi
	f'c =	6	ksi <= 10 ksi
Are bars "top bars" ? (Yor N) =		N	Top bars have 12 in. min. concrete cast below these bars
Are bars "epoxy coated" ? (Yor N) =		N	
Is concrete normal weight concrete ? (Yor N) =		Y	

Constants : -

α = 1.0 — Sec. 1912.2.4
β = 1.0 — Sec. 1912.2.4
γ = 0.8 for #6 and smaller, 1.0 for #7 and larger — Sec. 1912.2.4
λ = 1.0 — Sec. 1912.2.4
ς = 1/25 for (#6 & smaller)
ς = 1/20 for (#7 & larger)

NOTE:- Center to center bar spacing must be at least 3db and clear cover at least 1.5db.

Equations : - $ld = \varsigma\alpha\beta\lambda\ fy\ db/(f'c)^{1/2}$ min. — Sec. 1912.2.2

$ld = 3\alpha\beta\gamma\lambda\ fy\ db^2/(40(f'c)^{1/2}(c+Ktr/db))$ min. — $c+Ktr/db = 1.5$ — Sec. 1912.2.3

ld = 12 in. min. — Sec. 1912.2.1

REINFORCING TENSION DEVELOPMENT LENGTHS (inches)

Reinforcing size #	Minimum ctr. to ctr. Spacing	Minimum clear cover	Required straight Embedment	Required straight Embedment
3	1 1/8	0.375	31db	12in.
4	1 1/2	0.500	31db	16in.
5	1 7/8	0.625	31db	20in.
6	2 1/4	0.750	31db	24in.
7	2 5/8	0.875	39db	34in.
8	3	1.000	39db	39in.
9	3 3/8	1.128	39db	44in.
10	3 7/8	1.270	39db	50in.
11	4 1/4	1.410	39db	55in.

REINFORCING COMPRESSION DEVELOPMENT LENGTHS (inches) — Sec. 1912.3

Reinforcing size #	Minimum ctr. to ctr. Spacing	Minimum clear cover	Required straight Embedment	Required straight Embedment
3	1 1/8	0.375	18db	8in.
4	1 1/2	0.500	18db	9in.
5	1 7/8	0.625	18db	12in.
6	2 1/4	0.750	18db	14in.
7	2 5/8	0.875	18db	16in.
8	3	1.000	18db	18in.
9	3 3/8	1.128	18db	21in.
10	3 7/8	1.270	18db	23in.
11	4 1/4	1.410	18db	26in.

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REINFORCING STEEL TENSION SPLICE LENGTHS (inches)[1,2,3&4]

GRADE 60 UNCOATED BARS NORMAL WEIGHT CONCRETE
per 1997 UBC Sec. 1912.2.1, 1912.2.3 , 1912.2.4 , 1912.14 & 1912.15
per ACI 318-95 & 99 Sec. 12.2.1, 12.2.3 , 12.2.4 , 12.14 & 12.15

Fy (ksi) =	60	NORMAL WEIGHT CONCRETE? (Y or N)	Y
F'c (ksi) =	10	EPOXY COATED BARS? (Y or N)	N

Lap Class "A":- As = 2*As (required) & max. 50% bars spliced. Lap Class "B" = ALL OTHER

Lap lengths (inches)								
Bar Size	Lap Class	Top bars[4] Category			Other bars[4] Category		
		1	2	3	1	2	3
#3	B	23	16	16	18	16	16
#4	B	31	21	16	24	16	16
#5	B	39	26	16	30	20	16
#6	B	46	31	19	36	24	16
#7	B	67	45	27	52	35	21
#8	B	77	51	31	59	39	24
#9	B	86	58	35	66	44	27
#10	B	97	65	39	75	50	30
#11	B	108	72	43	83	55	33

Category				
Structural Element	Minimum Clear Concrete Cover*	Minimum Center to Center Bar Spacing*		
		>=2db <3db	>=3db <5db	>=5db
Beams & Columns w/ code ties	>=1db,<1.5db	2	2	2
	>=1.5db,<2db	2	2	3
	>=2db	2	2	3
Other	>=1db,<1.5db	1	1	1
	>=1.5db,<2db	1	2	2
	>=2db	1	2	3

* db = bar diameter

NOTES : - 1.) Categories 1 thru 3 which depend on the type of structural element, concrete cover, and the center to center spacing of the bars are defined above right :-

2.) Lap splice lengths are multiples of tension development lengths. Class A = 1.0*ld & Class B = 1.3*ld (ACI 12.15.1). Values for ld for bars in beams or columns are based on transverse reinforcement meeting requirements for stirrups in ACI 11.5.4 & 11.5.5.3 or meeting tie requirements in ACI 7.10.5: & are based on minimum cover specified in ACI 7.7.1.

3.) Conditions which require Category 1 lap splice lengths (shaded regions) should be avoided if at all possible for the larger bar sizes. These inordinately long lengths present possible constructability problems due to placing, congestion, etc. Options available in trying to avoid Category 1 conditions include:

a.) Increasing the concrete cover to more than 1.5 bar diameters and increasing the bar center-to-center spacing to more than three diameters.

b.) Utilizing the Atr allowance in ACI 12.2.3.1(b) for beams or columns. Note that if ties or stirrups meet the minimum Atr requirement, Category 1 lengths are reduced to Category 2 lengths.

4.) Top bars are horizontal bars with more than 12 in. of concrete cast below the bars.

5.) @ Category = 1 2 3
(c+Ktr)/db = 1 1.5 2.5

Table R12.15.2 - Tension lap splices

As provided / As required	Maxumum percent of As spliced within required lap length	
	50	100
Equal to or greater than 2	Class A	Class B
Less than 2	Class B	Class B

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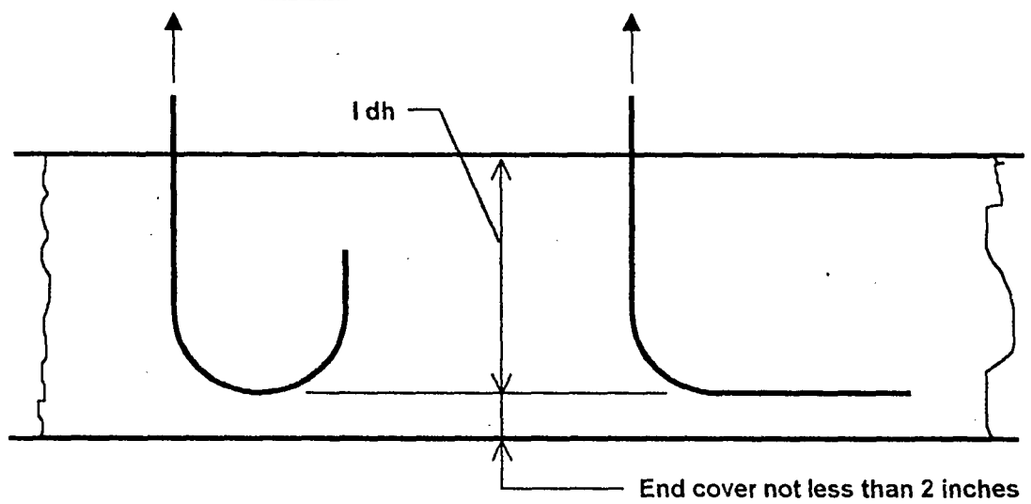
Tension Embedment of Standard REINFORCING STEEL HOOKS (inches)

#11 Bars and smaller

per ACI 318-95 Sec 12.5
per 97 UBC Sec 1912.5

	Input	
Concrete strength F'c =	10	ksi
Bar yield strength Fy =	60	ksi
Is concrete cover less than 2-1/2" ? (Y or N) =	N	(Normal to plane of hook)
Is concrete cover less than 2" ? (Y or N) =	N	(Beyond end of 90 degree hook)
Is hook enclosed within ties ? (Y or N) =	N	(Along the full development length spaced<=3db)
As (required)/As (provided) =	1	
Is concrete lightweight ? (Y or N) =	N	
Are bars epoxy coated ? (Y or N) =	N	

Bar Size	l dh
#3	6 in.
#4	6 in.
#5	6 in.
#6	7 in.
#7	8 in.
#8	9 in.
#9	10 in.
#10	11 in.
#11	12 in.



Reinforcing Tension Values with Reduced Hook Embedment

by ratioing actual embedment to required embedment with a .50 lower limit.

	Input			
Bar Size =	5			
Actual Embedment =	6	in.		
	Output			
Required Embedment =	6	in.	(for full value)	
Ratio =	1.00	actual/required		
As =	0.31	$in.^2$		
Reduced Fy =	60	ksi	(ultimate)	
Reduced Tu =	16.7	kips	(ultimate)	.9 Fy As
Reduced Ts = Tu/1.4 =	11.93	kips	(working)	

3/7/2003
REBAR095.XLS

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ENGINEERS-NORTHWEST,INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

REINFORCING TENSION DEVELOPMENT LENGTHS (in.)

1997 UBC Section 1912.2 & ACI 318-95 & 99 Section 12.2

Input : - fy =	60	ksi
f'c =	10	ksi <= 10 ksi
Are bars "top bars" ? (Yor N) =	N	Top bars have 12 in. min. concrete cast below these bars
Are bars "epoxy coated" ? (Yor N) =	N	
Is concrete normal weight concrete ? (Yor N) =	Y	

Constants : -

α = 1.0	Sec. 1912.2.4
β = 1.0	Sec. 1912.2.4
γ = 0.8 for #6 and smaller, 1.0 for #7 and larger	Sec. 1912.2.4
λ = 1.0	Sec. 1912.2.4
ς = 1/25 for (#6 & smaller)	
ς = 1/20 for (#7 & larger)	

NOTE:- Center to center bar spacing must be at least 3db and clear cover at least 1.5db.

Equations : -	ld = $\varsigma\alpha\beta\lambda$ fy db/(f'c)$^{1/2}$ min.		Sec. 1912.2.2
	ld = 3$\alpha\beta\gamma\lambda$ fy db^2 /(40(f'c)$^{1/2}$(c+Ktr/db)) min.	c+Ktr/db = 1.5	Sec. 1912.2.3
	ld = 12 in. min.		Sec. 1912.2.1

REINFORCING TENSION DEVELOPMENT LENGTHS (inches)

Reinforcing size #	Minimum ctr. to ctr. Spacing	Minimum clear cover	Required straight Embedment	Required straight Embedment
3	1 1/8	0.375	24db	12in.
4	1 1/2	0.500	24db	12in.
5	1 7/8	0.625	24db	15in.
6	2 1/4	0.750	24db	18in.
7	2 5/8	0.875	30db	27in.
8	3	1.000	30db	30in.
9	3 3/8	1.128	30db	34in.
10	3 7/8	1.270	30db	39in.
11	4 1/4	1.410	30db	43in.

REINFORCING COMPRESSION DEVELOPMENT LENGTHS (inches) Sec. 1912.3

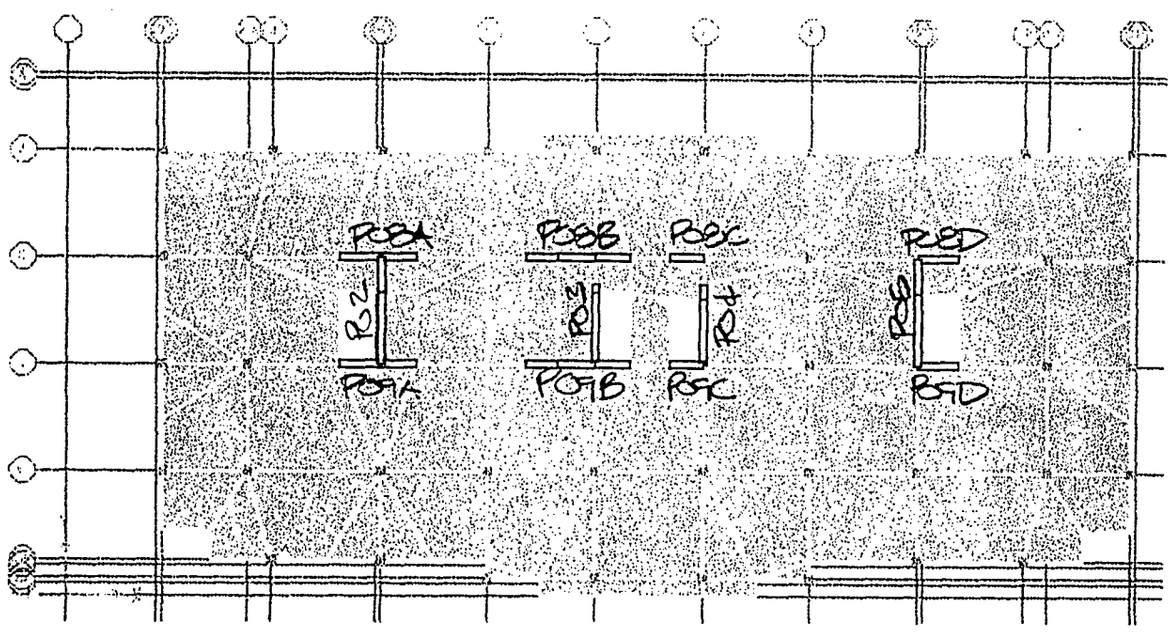
Reinforcing size #	Minimum ctr. to ctr. Spacing	Minimum clear cover	Required straight Embedment	Required straight Embedment
3	1 1/8	0.375	18db	8in.
4	1 1/2	0.500	18db	9in.
5	1 7/8	0.625	18db	12in.
6	2 1/4	0.750	18db	14in.
7	2 5/8	0.875	18db	16in.
8	3	1.000	18db	18in.
9	3 3/8	1.128	18db	21in.
10	3 7/8	1.270	18db	23in.
11	4 1/4	1.410	18db	26in.

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

ETABS

Engineers Northwest

L1



ETABS v7.22 - File: INS_Tukwila_2_2 - March 20,2003 15:43
Plan View - ROOF - Elevation 1008 - Kip-in Units

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RECEIVED
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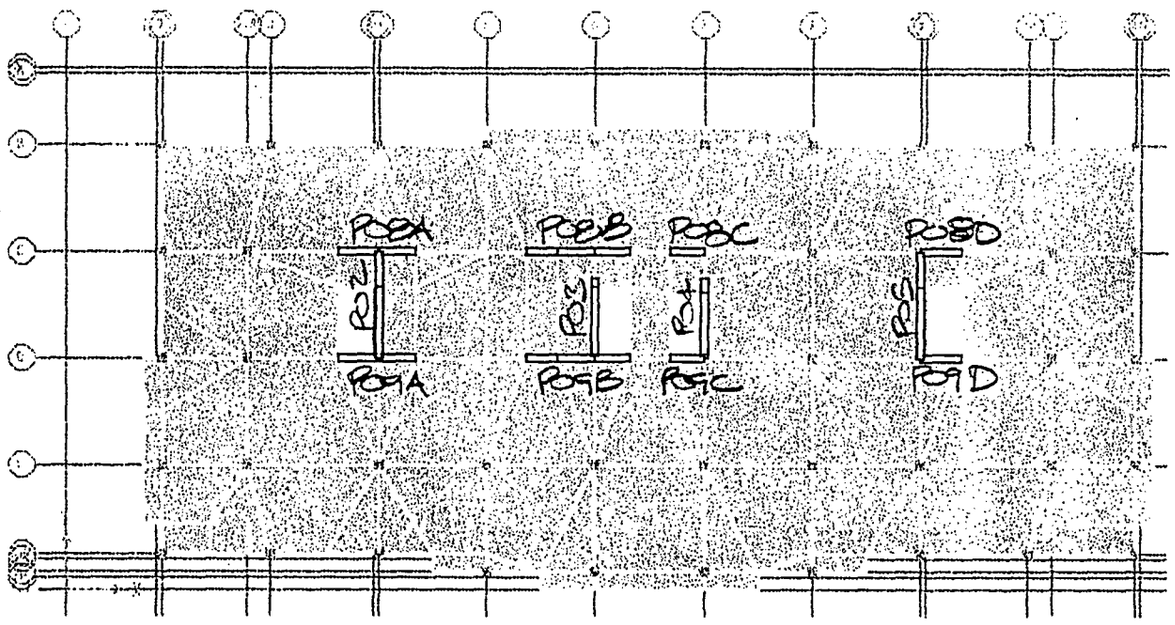
ETABS

Engineers Northwest

L2



ETABS v7.22 - File: INS_Tukwila_2_2 - March 20,2003 15:43
Plan View - STORY4 - Elevation 852 - Kip-in Units

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

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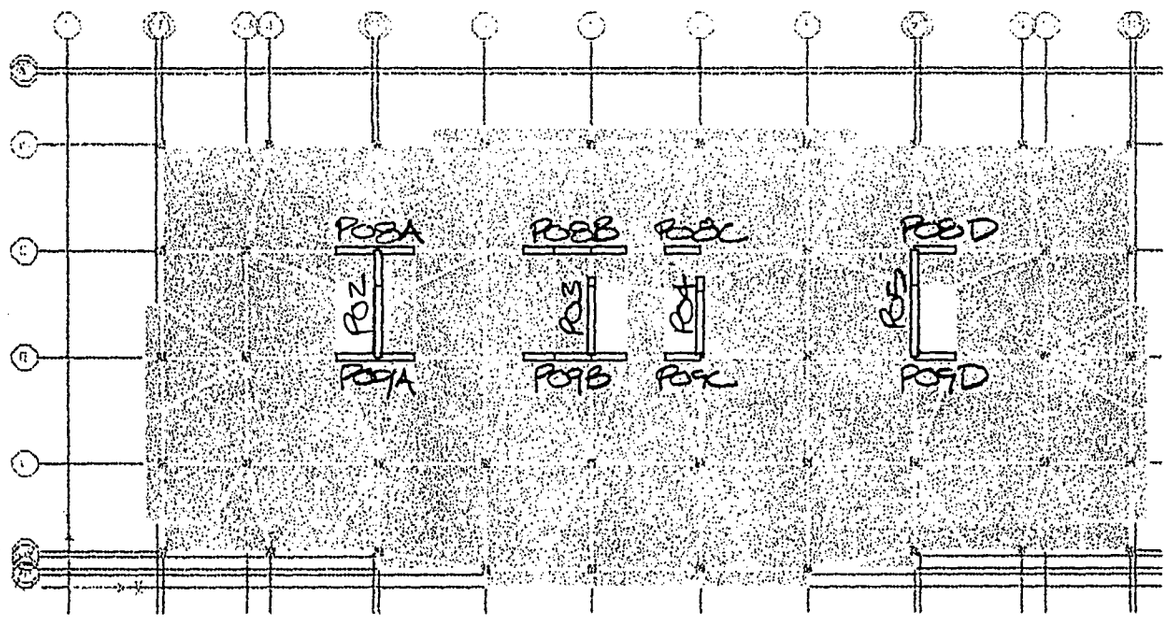
MAR 21 2003
CITY OF TUKWILA

23



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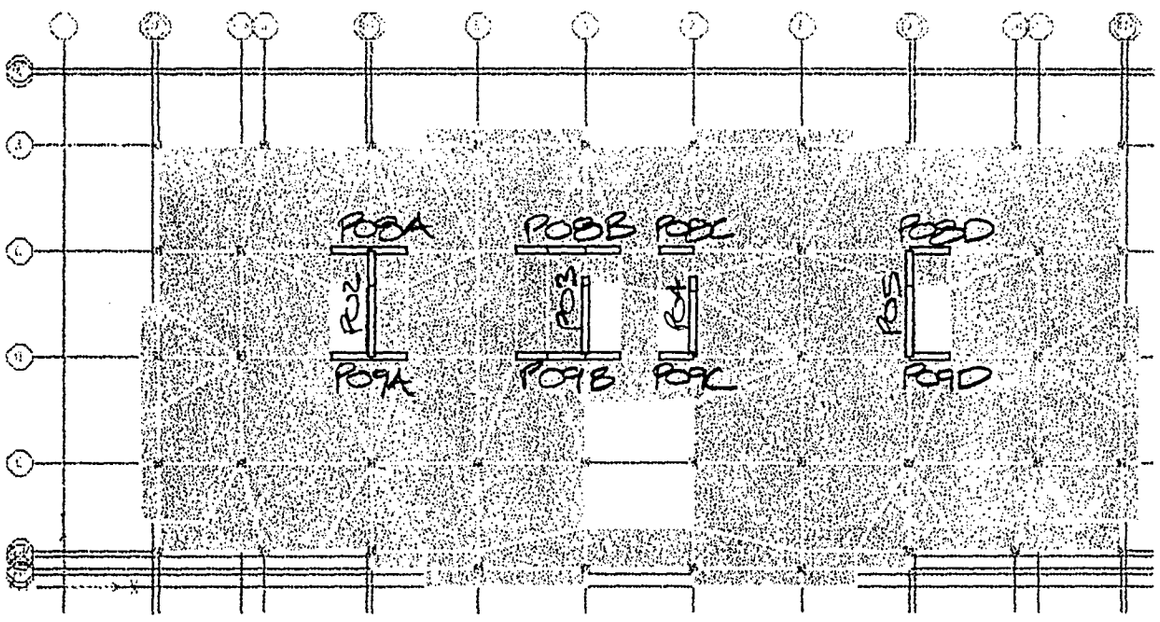
L4



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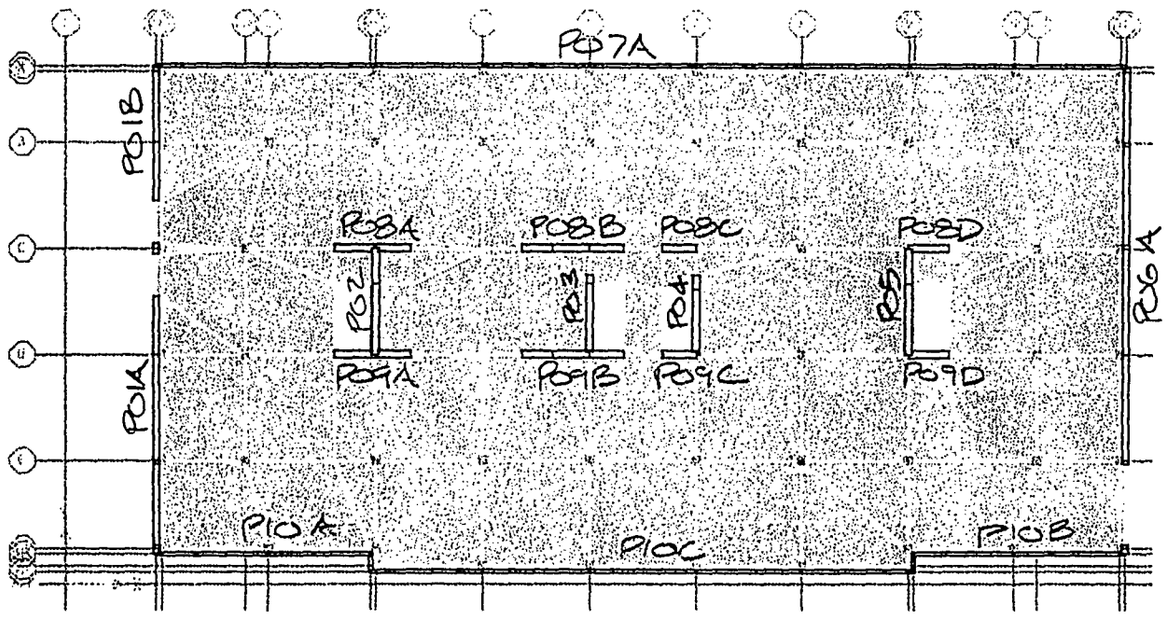
DCI-03-03

LS



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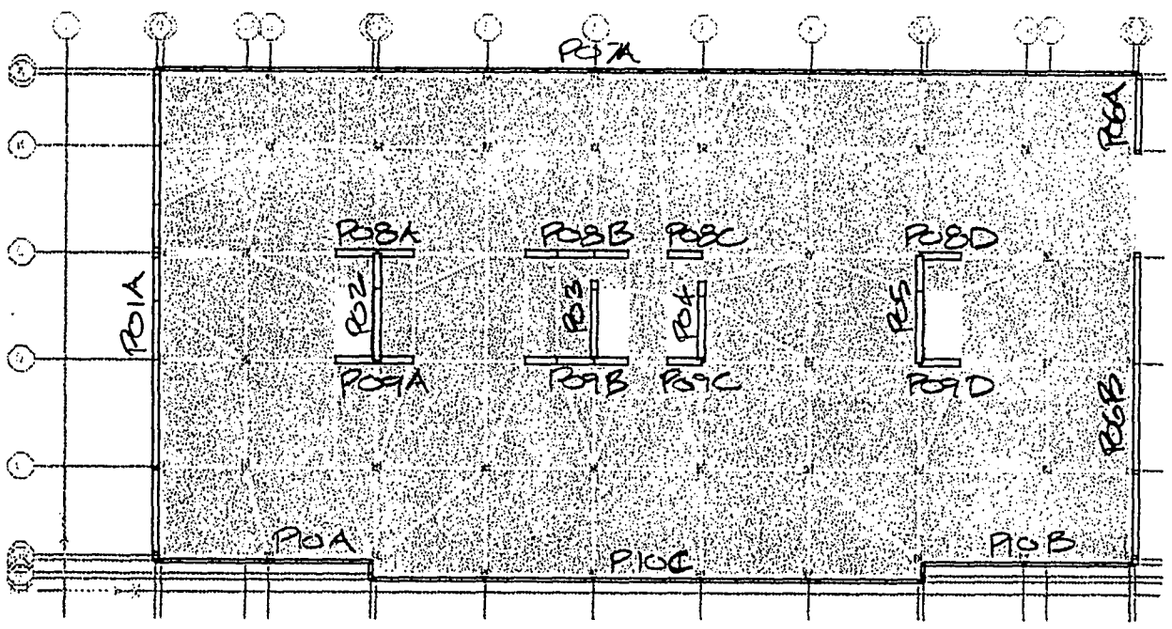
ETABS

Engineers Northwest

LG



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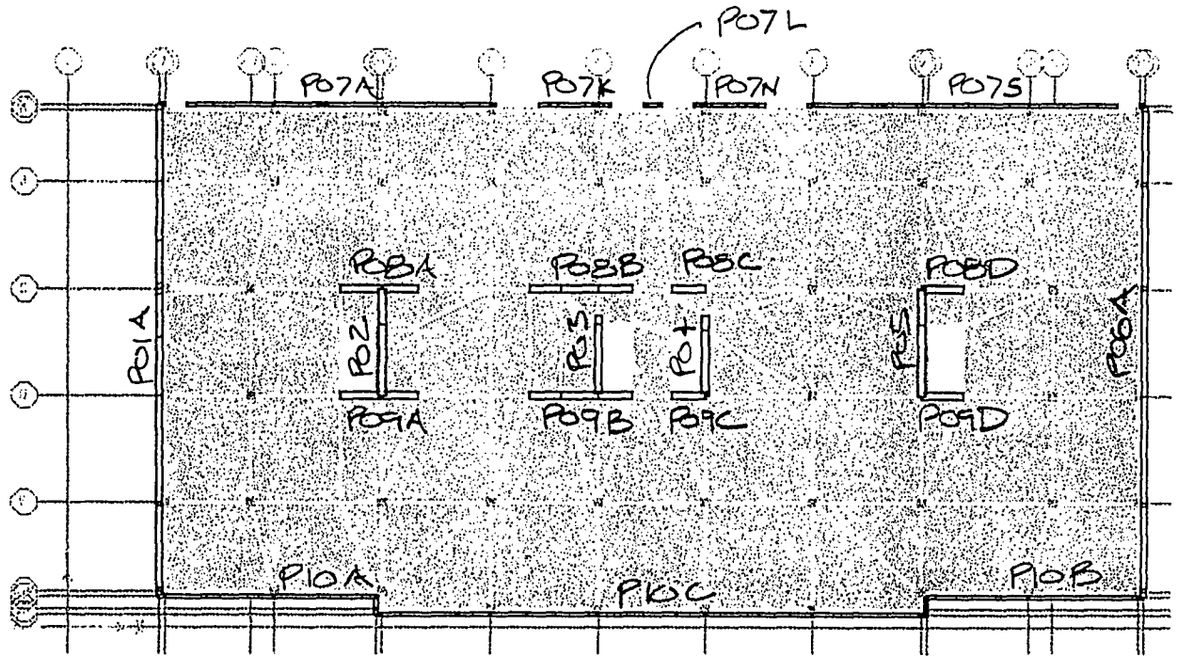
ETABS v7.22 - File: INS_Tukwila_2_2 - March 20,2003 15:44
Plan View - P1 - Elevation 240 - Kip-in Units

ETABS

Engineers Northwest

L7



NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

ETABS v7.22 - File: INS_Tukwila_2_2 - March 20,2003 15:44
Plan View - P2 - Elevation 120 - Kip-in Units

ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

Rev. 3/18/99

Input = cells shaded thus
Job number 02110
Job name INS Building - Tukwilla, WA -- Story 2 - NS

97 UBC Section 1630.1.1 Redundancy Factor (for shearwalls)

CALC ρ FOR STORY 2 & BELOW
2/3(7 LEVELS) = 4.67 ~ 4TH LEVEL DOWN (240 FT) Definitions:- 1.) Wall = summation of piers in a line
OR h = 1008" ⇒ 2/3(1008") = 672" > 540" (2ND FLOOR) 2.) Pier = a segment of a wall

Direction of earthquake	NS						
Wall on Grid Line	C	C	C	C			
Pier	P08A	P08B	P08C	P08D			
% of story shear to this wall =	47.3	47.3	47.3	47.3			
% of wall shear to this pier =	32.1	45.4	6.8	15.7			
Length of this pier (lw) =	21.5	28.5	9.5	11.5			ft.
AB(ground area of the structure) =	39000	39000	39000	39000	39000	39000	ft.^{2}
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	15.18	21.47	3.22	7.43	0.00	0.00	
ri =	0.071	0.075	0.034	0.065	0.000	0.000	
ρ calc.=	0.57	0.66	-0.99	0.43	0.00	0.00	
ρ =	1.00	1.00	1.00	1.00	0.00	0.00	

ρ design = 1.00
For NS Shearwalls

Direction of earthquake	NS						
Wall on Grid Line	D	D	D	D			
Pier	P09A	P09B	P09C	P09D			
% of story shear to this wall =	52.7	52.7	52.7	52.7			
% of wall shear to this pier =	30.9	45.1	9.6	14.4			
Length of this pier (lw) =	21.5	28.5	9.5	11.5			ft.
AB(ground area of the structure) =	39000	39000	39000	39000	39000	39000	ft.^{2}
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	16.28	23.77	5.06	7.59	0.00	0.00	
ri =	0.076	0.083	0.053	0.066	0.000	0.000	
ρ calc.=	0.66	0.79	0.10	0.47	0.00	0.00	
ρ =	1.00	1.00	1.00	1.00	0.00	0.00	

ρ design = 1.00
For NS Shearwalls

NOTE :- In order for ρ design not to exceed 1.00, then ri max. = 0.101 & the pier shear for this structure must not exceed 1.012 % of the story shear per lineal foot of the pier. In other words a 20'-0"long pier should not carry more than 20.25 % of the story shear for this AB.

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

Input = cells shaded thus
Job number 02110
Job name INS Building - Tukwilla, WA -- Story 2 - EW

97 UBC Section 1630.1.1 Redundancy Factor (for shearwalls)

Definitions:- 1.) Wall = summation of piers in a line
2.) Pier = a segment of a wall

Direction of earthquake	EW						
Wall on Grid Line	4	6	7	9			
Pier	P02	P03	P04	P05			
% of story shear to this wall =	35.1	16.7	14.5	33.7			
% of wall shear to this pier =	100	100	100	100			
Length of this pier (lw) =	30	22.5	22.5	32			ft.
AB(ground area of the structure) =	39000	39000	39000	39000	39000	39000	ft.^{2}
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	35.10	16.70	14.50	33.70	0.00	0.00	
ri =	0.117	0.074	0.064	0.105	0.000	0.000	
ρ calc.=	1.13	0.64	0.43	1.04	0.00	0.00	
ρ =	1.13	1.00	1.00	1.04	0.00	0.00	

ρ design = 1.13
For EW Shearwalls

Direction of earthquake							
Wall on Grid Line							
Pier							
% of story shear to this wall =							
% of wall shear to this pier =							
Length of this pier (lw) =							ft.
AB(ground area of the structure) =	39000	39000	39000	39000	39000	39000	ft.^{2}
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	0.00	0.00	0.00	0.00	0.00	0.00	
ri =	0.000	0.000	0.000	0.000	0.000	0.000	
ρ calc.=	0.00	0.00	0.00	0.00	0.00	0.00	
ρ =	0.00	0.00	0.00	0.00	0.00	0.00	

ρ design = 0.00
For Shearwalls

NOTE :- In order for ρ design not to exceed 1.00, then ri max. = 0.101 & the pier shear for this structure must not exceed 1.012 % of the story shear per lineal foot of the pier. In other words a 20'-0"long pier should not carry more than 20.25 % of the story shear for this AB.

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ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

Input = cells shaded thus
Job number 02110
Job name INS Building - Tukwilla, WA – Story 1 - NS

97 UBC Section 1630.1.1 Redundancy Factor (for shearwalls)

Definitions:- 1.) Wall = summation of piers in a line
2.) Pier = a segment of a wall

Direction of earthquake	NS						
Wall on Grid Line	A	A	C	C	C	C	
Pier	P07B	P07C	P08A	P08B	P08C	P08D	
% of story shear to this wall =	95.7	95.7	64.1	64.1	64.1	64.1	
% of wall shear to this pier =	50.1	49.9	33.5	44.8	6.2	15.5	
Length of this pier (lw) =	93	93	21.5	28.5	9.5	11.5	ft.
A_B(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	47.95	47.75	21.47	28.72	3.97	9.94	
ri =	0.052	0.051	0.100	0.101	0.042	0.086	
ρ calc.=	0.04	0.03	0.99	0.99	-0.42	0.83	
ρ =	1.00	1.00	1.00	1.00	1.00	1.00	

ρ design = 1.00
For NS Shearwalls

Direction of earthquake	NS						
Wall on Grid Line	D	D	D	D	E/F	E/F	
Pier	P09A	P09B	P09C	P09D	P10A/B	P10C	
% of story shear to this wall =	69.7	69.7	69.7	69.7	138	138	
% of wall shear to this pier =	33.1	43.7	8.1	15.1	21.3	57.7	
Length of this pier (lw) =	21.5	28.5	9.5	11.5	60	153	ft.
A_B(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	23.07	30.46	5.65	10.52	29.39	79.63	
ri =	0.107	0.107	0.059	0.092	0.049	0.052	
ρ calc.=	1.06	1.05	0.30	0.89	-0.07	0.05	
ρ =	1.06	1.05	1.00	1.00	1.00	1.00	

ρ design = 1.06
For NS Shearwalls

NOTE :- In order for ρ design not to exceed 1.00, then ri max. = 0.101 & the pier shear for this structure must not exceed 1.012 % of the story shear per lineal foot of the pier. In other words a 20'-0"long pier should not carry more than 20.25 % of the story shear for this AB.

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ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

Input = cells shaded thus
Job number 02110
Job name INS Building - Tukwilla, WA -- Story 1 - EW

97 UBC Section 1630.1.1 Redundancy Factor (for shearwalls)

Definitions:- 1.) Wall = summation of piers in a line
2.) Pier = a segment of a wall

Direction of earthquake	EW						
Wall on Grid Line	2	2	4	6	7	9	
Pier	P01A	P01B	P02	P03	P04	P05	
% of story shear to this wall =	61.6	61.6	0.8	8.8	8.2	13.9	
% of wall shear to this pier =	70.3	29.7	100	100	100	100	
Length of this pier (lw) =	73	38	30	22.5	22.5	30	ft.
A_B(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	43.30	18.30	0.80	8.80	8.20	13.90	
ri =	0.059	0.048	0.003	0.039	0.036	0.046	
ρ calc.=	0.29	-0.10	-35.98	-0.59	-0.78	-0.19	
ρ =	1.00	1.00	1.00	1.00	1.00	1.00	

ρ design = 1.00
For EW Shearwalls

Direction of earthquake	EW						
Wall on Grid Line	11						
Pier	P06A						
% of story shear to this wall =	70						
% of wall shear to this pier =	100						
Length of this pier (lw) =	112.5						ft.
A_B(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	70.00	0.00	0.00	0.00	0.00	0.00	
ri =	0.062	0.000	0.000	0.000	0.000	0.000	
ρ calc.=	0.37	0.00	0.00	0.00	0.00	0.00	
ρ =	1.00	0.00	0.00	0.00	0.00	0.00	

ρ design = 1.00
For EW Shearwalls

NOTE :- In order for ρ design not to exceed 1.00, then ri max. = 0.101 & the pier shear for this structure must not exceed 1.012 % of the story shear per lineal foot of the pier. In other words a 20'-0"long pier should not carry more than 20.25 % of the story shear for this AB.

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ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

Input = cells shaded thus
Job number 02110
Job name INS Building - Tukwilla, WA -- Story P1 - NS

97 UBC Section 1630.1.1 Redundancy Factor (for shearwalls)

Definitions:- 1.) Wall = summation of piers in a line
2.) Pier = a segment of a wall

Direction of earthquake	NS						
Wall on Grid Line	A	C	C	C	C	D	
Pier	P07A	P08A	P08B	P08C	P08D	P09A	
% of story shear to this wall =	72.6	21.6	21.6	21.6	21.6	22.9	
% of wall shear to this pier =	100	32.2	52.5	2.4	12.9	30.8	
Length of this pier (lw) =	273	21.5	28.5	9.5	11.5	21.5	ft.
AB(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	72.60	6.96	11.34	0.52	2.79	7.05	
ri =	0.027	0.032	0.040	0.005	0.024	0.033	
ρ calc.=	-1.81	-1.13	-0.55	-16.56	-2.18	-1.09	
ρ =	1.00	1.00	1.00	1.00	1.00	1.00	

ρ design = 1.00
For NS Shearwalls

Direction of earthquake	NS						
Wall on Grid Line	D	D	D	E/F	E/F	E/F	
Pier	P09B	P09C	P09D	P10A	P10B	P10C	
% of story shear to this wall =	22.9	22.9	22.9	72.8	72.8	72.8	
% of wall shear to this pier =	50.9	7.2	11.2	21.1	20	58	
Length of this pier (lw) =	28.5	9.5	11.5	60	60	153	ft.
AB(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	11.66	1.65	2.56	15.36	14.56	42.22	
ri =	0.041	0.017	0.022	0.026	0.024	0.028	
ρ calc.=	-0.48	-3.84	-2.54	-1.96	-2.17	-1.67	
ρ =	1.00	1.00	1.00	1.00	1.00	1.00	

ρ design = 1.00
For NS Shearwalls

NOTE :- In order for ρ design not to exceed 1.00, then ri max. = 0.101 & the pier shear for this structure must not exceed 1.012 % of the story shear per lineal foot of the pier. In other words a 20'-0"long pier should not carry more than 20.25 % of the story shear for this AB.

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

Input = cells shaded thus
Job number 02110
Job name INS Building - Tukwilla, WA -- Story P1 - EW

97 UBC Section 1630.1.1 Redundancy Factor (for shearwalls)

Definitions:- 1.) Wall = summation of piers in a line
2.) Pier = a segment of a wall

Direction of earthquake	EW						
Wall on Grid Line	2	4	6	7	9	11	
Pier	P01A	P02	P03	P04	P05	P06A	
% of story shear to this wall =	54.7	0.7	2	2.1	2.5	51.3	
% of wall shear to this pier =	100	100	100	100	100	14.9	
Length of this pier (lw) =	138	30	22.5	22.5	30	22.5	ft.
A_B(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	54.70	0.70	2.00	2.10	2.50	7.64	
ri =	0.040	0.002	0.009	0.009	0.008	0.034	
ρ calc.=	-0.55	-41.40	-9.39	-8.85	-10.15	-0.98	
ρ =	1.00	1.00	1.00	1.00	1.00	1.00	

ρ design = 1.00
For EW Shearwalls

Direction of earthquake	EW						
Wall on Grid Line	11						
Pier	P06B						
% of story shear to this wall =	51.3						
% of wall shear to this pier =	85.1						
Length of this pier (lw) =	87.5						ft.
A_B(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	43.66	0.00	0.00	0.00	0.00	0.00	
ri =	0.050	0.000	0.000	0.000	0.000	0.000	
ρ calc.=	-0.03	0.00	0.00	0.00	0.00	0.00	
ρ =	1.00	0.00	0.00	0.00	0.00	0.00	

ρ design = 1.00
For EW Shearwalls

NOTE :- In order for ρ design not to exceed 1.00, then ri max. = 0.101 & the pier shear for this structure must not exceed 1.012 % of the story shear per lineal foot of the pier. In other words a 20'-0"long pier should not carry more than 20.25 % of the story shear for this AB.

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

Input = cells shaded thus
Job number 02110
Job name INS Building - Tukwilla, WA – Story P2 - NS1

97 UBC Section 1630.1.1 Redundancy Factor (for shearwalls)

Definitions:- 1.) Wall = summation of piers in a line
2.) Pier = a segment of a wall

Direction of earthquake	NS						
Wall on Grid Line	A	A	A	A	A	A	
Pier	P07A	P07K	P07L	P07P	P07Q	P07R	
% of story shear to this wall =	36.9	36.9	36.9	36.9	36.9	36.9	
% of wall shear to this pier =	41.2	10	2.2	3.9	0.9	0.6	
Length of this pier (lw) =	85.5	20	5	9.17	2	2.17	ft.
AB(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	15.20	3.69	0.81	1.44	0.33	0.22	
ri =	0.018	0.018	0.016	0.016	0.017	0.010	
ρ calc.=	-3.70	-3.49	-4.24	-4.45	-4.10	-7.93	
ρ =	1.00	1.00	1.00	1.00	1.00	1.00	

ρ design = 1.00
For NS Shearwalls

Direction of earthquake	NS						
Wall on Grid Line	A	C	C	C	C		
Pier	P07S	P08A	P08B	P08C	P08D		
% of story shear to this wall =	36.9	7.4	7.4	7.4	7.4		
% of wall shear to this pier =	41.1	33.8	31.6	15.6	19		
Length of this pier (lw) =	85.5	21.5	28.5	9.5	11.5		ft.
AB(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	15.17	2.50	2.34	1.15	1.41	0.00	
ri =	0.018	0.012	0.008	0.012	0.012	0.000	
ρ calc.=	-3.71	-6.71	-10.34	-6.33	-6.28	0.00	
ρ =	1.00	1.00	1.00	1.00	1.00	0.00	

ρ design = 1.00
For NS Shearwalls

NOTE :- In order for ρ design not to exceed 1.00, then ri max. = 0.101 & the pier shear for this structure must not exceed 1.012 % of the story shear per lineal foot of the pier. In other words a 20'-0"long pier should not carry more than 20.25 % of the story shear for this AB.

NOTICE: IF THE DOCUMENT IN THIS FRAME IS LESS CLEAR THAN THIS NOTICE IT IS DUE TO THE QUALITY OF THE DOCUMENT.

ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

Input = cells shaded thus
Job number 02110
Job name INS Building - Tukwilla, WA -- Story P2 - NS2

97 UBC Section 1630.1.1 Redundancy Factor (for shearwalls)

Definitions:- 1.) Wall = summation of piers in a line
2.) Pier = a segment of a wall

Direction of earthquake	NS						
Wall on Grid Line	D	D	D	D			
Pier	P09A	P09B	P09C	P09D			
% of story shear to this wall =	6.8	6.8	6.8	6.8			
% of wall shear to this pier =	35.7	31.8	10.5	22			
Length of this pier (lw) =	21.5	28.5	9.5	11.5			ft.
AB(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	2.43	2.16	0.71	1.50	0.00	0.00	
ri =	0.011	0.008	0.008	0.013	0.000	0.000	
ρ calc.=	-6.97	-11.35	-11.47	-5.79	0.00	0.00	
ρ =	1.00	1.00	1.00	1.00	0.00	0.00	

ρ design = 1.00
For NS Shearwalls

Direction of earthquake	NS						
Wall on Grid Line	E/F	E/F	E/F				
Pier	P10A	P10B	P10C				
% of story shear to this wall =	48.9	48.9	48.9				
% of wall shear to this pier =	21.5	21.5	57				
Length of this pier (lw) =	60	60	153				ft.
AB(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	10.51	10.51	27.87	0.00	0.00	0.00	
ri =	0.018	0.018	0.018	0.000	0.000	0.000	
ρ calc.=	-3.78	-3.78	-3.56	0.00	0.00	0.00	
ρ =	1.00	1.00	1.00	0.00	0.00	0.00	

ρ design = 1.00
For NS Shearwalls

NOTE :- In order for ρ design not to exceed 1.00, then ri max. = 0.101 & the pier shear for this structure must not exceed 1.012 % of the story shear per lineal foot of the pier. In other words a 20'-0"long pier should not carry more than 20.25 % of the story shear for this AB.

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ENGINEERS-NORTHWEST, INC.P.S.
6869 WOODLAWN AVE. N.E. (SUITE 205)
SEATTLE, WA. 98115

Input = cells shaded thus
Job number 02110
Job name INS Building - Tukwilla, WA -- Story P2 - EW

97 UBC Section 1630.1.1 Redundancy Factor (for shearwalls)

Definitions:- 1.) Wall = summation of piers in a line
2.) Pier = a segment of a wall

Direction of earthquake	EW						
Wall on Grid Line	2	4	6	7	9	11	
Pier	P01A	P02	P03	P04	P05	P06A	
% of story shear to this wall =	41.6	5.9	3.4	2.9	4.4	41.8	
% of wall shear to this pier =	100	100	100	100	100	100	
Length of this pier (lw) =	138	30	22.5	22.5	30	138	ft.
A_B(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	41.60	5.90	3.40	2.90	4.40	41.80	
ri =	0.030	0.020	0.015	0.013	0.015	0.030	
ρ calc.=	-1.36	-3.15	-4.70	-5.86	-4.91	-1.34	
ρ =	1.00	1.00	1.00	1.00	1.00	1.00	

ρ design = 1.00
For EW Shearwalls

Direction of earthquake							
Wall on Grid Line							
Pier							
% of story shear to this wall =							
% of wall shear to this pier =							
Length of this pier (lw) =							ft.
A_B(ground area of the structure) =	39000	39000	39000	39000	39000	39000	$ft.^2$
	Output	Output	Output	Output	Output	Output	
% of story shear to this pier =	0.00	0.00	0.00	0.00	0.00	0.00	
ri =	0.000	0.000	0.000	0.000	0.000	0.000	
ρ calc.=	0.00	0.00	0.00	0.00	0.00	0.00	
ρ =	0.00	0.00	0.00	0.00	0.00	0.00	

ρ design = 0.00
For Shearwalls

NOTE :- In order for ρ design not to exceed 1.00, then ri max. = 0.101 & the pier shear for this structure must not exceed 1.012 % of the story shear per lineal foot of the pier. In other words a 20'-0"long pier should not carry more than 20.25 % of the story shear for this AB.

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Floor Masses & Mass Ratios

7199.42 43996.44

	Fi	hi	Fi/Vb	(Fi/Vb)/hi	((Fi/Vb)/hi)/(Σ(Fi/Vb)/hi)	mi	mi/mi+1	mi/mi-1		
ROOF	1688.84	84	0.235	0.0028	0.121	5341.11		0.891	0.891	O.K.
Story 4	1601.77	71	0.222	0.0031	0.136	5993.28	1.122	0.985	1.122	O.K.
Story 3	1327.91	58	0.184	0.0032	0.138	6082.24	1.015	1.033	1.033	O.K.
Story 2	997.64	45	0.139	0.0031	0.134	5889.58	0.968	0.800	0.968	O.K.
Story 1	831.18	30	0.115	0.0038	0.167	7360.32	1.250	1.107	1.250	O.K.
P1	500.60	20	0.070	0.0035	0.151	6649.42	0.903	0.995	0.995	O.K.
P2	251.47	10	0.035	0.0035	0.152	6680.50	1.005		1.005	O.K.
				0.0230						

NO MASS IRREGULARITY

	h	m	hm	hm/Σhm	F
ROOF	84.00	5341.11	448654	0.235	1688.842
Story 4	71.00	5993.28	425523	0.222	1601.772
Story 3	58.00	6082.24	352770	0.184	1327.912
Story 2	45.00	5889.58	265031	0.139	997.641
Story 1	30.00	7360.32	220810	0.115	831.181
P1	20.00	6649.42	132988	0.070	500.601
P2	10.00	6680.50	66805	0.035	251.470
			1912580		

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Joint Displacements, Story Drift, Stifness Ratios

X-direction - positive e

Floor	Corner Displacement SE	SW	Delta Ave	1.2*Dave		h	drift	
R	0.459	0.475	0.467	0.560	O.K.	13	0.000747	
4	0.344	0.356	0.350	0.420	O.K.	13	0.000749	0.998
3	0.230	0.237	0.234	0.280	O.K.	13	0.000680	1.101
2	0.126	0.129	0.127	0.153	O.K.	15	0.000508	1.339
1	0.037	0.035	0.036	0.043	O.K.			

NO STIFFNESS IRREGULARITY

X-direction - negative e

Floor	Corner Displacement SE	SW	Delta Ave	1.2*Dave		h	drift	
R	0.429	0.518	0.473	0.568	O.K.	13	0.000757	
4	0.321	0.389	0.355	0.426	O.K.	13	0.000759	0.998
3	0.214	0.260	0.237	0.284	O.K.	13	0.000690	1.100
2	0.117	0.141	0.129	0.155	O.K.	15	0.000517	1.335
1	0.036	0.037	0.036	0.043	O.K.			

Y-direction - positive e

Floor	Corner Displacement NE	SE	Delta Ave	1.2*Dave		h	drift	
R	0.129	0.417	0.273	0.328	N.G.	13	0.000368	
4	0.108	0.324	0.216	0.259	N.G.	13	0.000393	0.935
3	0.083	0.226	0.154	0.185	N.G.	13	0.000379	1.039
2	0.059	0.132	0.095	0.114	N.G.	15	0.000329	1.151
1	0.032	0.040	0.036	0.043	O.K.			

TORSIONAL IRREGULARITY!

Y-direction - negative e

Floor	Corner Displacement NE	SE	Delta Ave	1.2*Dave		h	drift	
R	0.300	0.223	0.261	0.313	O.K.	13	0.000347	
4	0.240	0.174	0.207	0.248	O.K.	13	0.000374	0.930
3	0.173	0.125	0.149	0.178	O.K.	13	0.000361	1.035
2	0.106	0.078	0.092	0.111	O.K.	15	0.000316	1.143
1	0.038	0.033	0.035	0.042	O.K.			

LATERAL SYSTEMS ARE PARALLEL
NO RE-ENTRANT CORNERS,
NO OUT-OF-PLANE OFFSETS IN WALLS
NO WEAK STORY

BUILDING HAS ONLY TORSIONAL IRREGULARITY

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P O I N T D I S P L A C E M E N T S

STORY	POINT	LOAD	UX	UY	UZ	RX	RY	RZ
ROOF	52	EQXPOS	0.4746	0.0022	-0.0729	0.00037	0.00023	0.00001
ROOF	52	EQXNEG	0.5175	0.0852	-0.0705	0.00045	0.00016	0.00006
ROOF	52	EQYPOS	0.0564	0.4022	0.0291	0.00031	-0.00036	0.00006
ROOF	52	EQYNEG	-0.0342	0.2264	0.0240	0.00014	-0.00022	-0.00002
ROOF	C31	EQXPOS	0.4592	-0.0322	0.0002	0.00004	0.00061	0.00001
ROOF	C31	EQXNEG	0.4288	-0.1126	0.0004	0.00014	0.00057	0.00006
ROOF	C31	EQYPOS	-0.0659	0.1294	-0.0006	-0.00011	-0.00009	0.00009
ROOF	C31	EQYNEG	-0.0014	0.2996	-0.0012	-0.00032	-0.00001	-0.00001
ROOF	C40	EQXPOS	0.4592	0.0040	-0.0003	0.00000	0.00061	0.00001
ROOF	C40	EQXNEG	0.4288	0.0956	-0.0006	-0.00011	0.00057	0.00006
ROOF	C40	EQYPOS	-0.0659	0.4166	-0.0008	-0.00050	-0.00010	0.00009
ROOF	C40	EQYNEG	-0.0014	0.2226	-0.0001	-0.00026	-0.00001	-0.00002
STORY4	C10	EQXPOS	0.3562	0.0036	-0.0067	-0.00002	0.00074	0.00001
STORY4	C10	EQXNEG	0.3892	0.0742	-0.0067	-0.00016	0.00080	0.00005
STORY4	C10	EQYPOS	0.0429	0.3238	0.0025	-0.00058	0.00010	0.00007
STORY4	C10	EQYNEG	-0.0272	0.1743	0.0026	-0.00029	-0.00005	-0.00002
STORY4	C31	EQXPOS	0.3444	-0.0240	0.0000	0.00005	0.00070	0.00001
STORY4	C31	EQXNEG	0.3209	-0.0863	0.0003	0.00017	0.00065	0.00005
STORY4	C31	EQYPOS	-0.0493	0.1075	-0.0006	-0.00014	-0.00010	0.00007
STORY4	C31	EQYNEG	0.0006	0.2395	-0.0011	-0.00039	-0.00001	-0.00002
STORY4	C40	EQXPOS	0.3444	0.0036	-0.0002	0.00000	0.00070	0.00001
STORY4	C40	EQXNEG	0.3209	0.0742	-0.0004	-0.00014	0.00065	0.00005
STORY4	C40	EQYPOS	-0.0493	0.3238	-0.0007	-0.00059	-0.00011	0.00007
STORY4	C40	EQYNEG	0.0006	0.1743	-0.0001	-0.00030	-0.00001	-0.00002
STORY3	C10	EQXPOS	0.2372	0.0025	-0.0066	-0.00001	0.00072	0.00001
STORY3	C10	EQXNEG	0.2595	0.0500	-0.0066	-0.00015	0.00079	0.00003
STORY3	C10	EQYPOS	0.0285	0.2255	0.0024	-0.00060	0.00009	0.00004
STORY3	C10	EQYNEG	-0.0188	0.1247	0.0025	-0.00030	-0.00005	-0.00001
STORY3	C31	EQXPOS	0.2298	-0.0150	-0.0003	0.00005	0.00065	0.00001
STORY3	C31	EQXNEG	0.2139	-0.0572	-0.0001	0.00017	0.00060	0.00003
STORY3	C31	EQYPOS	-0.0322	0.0831	-0.0005	-0.00014	-0.00010	0.00004
STORY3	C31	EQYNEG	0.0016	0.1725	-0.0010	-0.00040	0.00000	-0.00001
STORY3	C40	EQXPOS	0.2298	0.0025	0.0001	-0.00001	0.00065	0.00001
STORY3	C40	EQXNEG	0.2139	0.0500	-0.0001	-0.00014	0.00060	0.00003
STORY3	C40	EQYPOS	-0.0322	0.2255	-0.0005	-0.00058	-0.00010	0.00004
STORY3	C40	EQYNEG	0.0016	0.1247	0.0000	-0.00029	0.00000	-0.00001
STORY2	C10	EQXPOS	0.1290	0.0009	-0.0064	-0.00003	0.00065	0.00000
STORY2	C10	EQXNEG	0.1408	0.0260	-0.0065	-0.00018	0.00072	0.00002
STORY2	C10	EQYPOS	0.0147	0.1316	0.0022	-0.00059	0.00009	0.00002
STORY2	C10	EQYNEG	-0.0102	0.0782	0.0024	-0.00028	-0.00006	-0.00001
STORY2	C31	EQXPOS	0.1259	-0.0063	-0.0008	0.00005	0.00058	0.00000
STORY2	C31	EQXNEG	0.1174	-0.0287	-0.0006	0.00017	0.00053	0.00002
STORY2	C31	EQYPOS	-0.0162	0.0589	-0.0003	-0.00014	-0.00009	0.00002
STORY2	C31	EQYNEG	0.0018	0.1063	-0.0007	-0.00041	0.00001	-0.00001
STORY2	C40	EQXPOS	0.1259	0.0009	0.0006	-0.00001	0.00058	0.00000
STORY2	C40	EQXNEG	0.1174	0.0260	0.0004	-0.00015	0.00053	0.00002
STORY2	C40	EQYPOS	-0.0162	0.1316	-0.0002	-0.00056	-0.00010	0.00002
STORY2	C40	EQYNEG	0.0018	0.0782	0.0002	-0.00027	0.00000	-0.00001
STORY1	C10	EQXPOS	0.0353	-0.0019	-0.0061	0.00004	0.00024	0.00000
STORY1	C10	EQXNEG	0.0367	0.0016	-0.0062	0.00001	0.00026	0.00000
STORY1	C10	EQYPOS	0.0015	0.0404	0.0019	-0.00021	0.00002	0.00000
STORY1	C10	EQYNEG	-0.0014	0.0332	0.0021	-0.00014	-0.00002	0.00000
STORY1	C31	EQXPOS	0.0368	0.0015	-0.0016	0.00001	0.00022	0.00000
STORY1	C31	EQXNEG	0.0355	-0.0013	-0.0014	0.00006	0.00021	0.00000
STORY1	C31	EQYPOS	-0.0022	0.0317	-0.0001	-0.00012	-0.00003	0.00000
STORY1	C31	EQYNEG	0.0004	0.0375	-0.0004	-0.00021	0.00000	0.00000
STORY1	C40	EQXPOS	0.0368	-0.0019	0.0013	-0.00001	0.00021	0.00000
STORY1	C40	EQXNEG	0.0355	0.0016	0.0012	-0.00006	0.00019	0.00000

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SEISMIC

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Engineers Northwest

P O I N T D I S P L A C E M E N T S

STORY	POINT	LOAD	UX	UY	UZ	RX	RY	RZ
STORY1	C40	EQYPOS	-0.0022	0.0404	0.0002	-0.00023	-0.00002	0.00000
STORY1	C40	EQYNEG	0.0004	0.0332	0.0004	-0.00014	0.00001	0.00000

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SCANNED

L21

D I S P L A C E M E N T S A T D I A P H R A G M C E N T E R O F M A S S

STORY	DIAPHRAGM	LOAD	POINT	X	Y	UX	UY	RZ
ROOF	DROOF	EQXPOS	536	1928.619	813.140	0.4669	-0.0142	0.00001
ROOF	DROOF	EQXNEG	536	1928.619	813.140	0.4729	-0.0091	0.00006
ROOF	DROOF	EQYPOS	536	1928.619	813.140	-0.0050	0.2722	0.00009
ROOF	DROOF	EQYNEG	536	1928.619	813.140	-0.0177	0.2613	-0.00002
STORY4	D4	EQXPOS	537	1921.244	817.037	0.3502	-0.0103	0.00001
STORY4	D4	EQXNEG	537	1921.244	817.037	0.3547	-0.0069	0.00005
STORY4	D4	EQYPOS	537	1921.244	817.037	-0.0037	0.2145	0.00007
STORY4	D4	EQYNEG	537	1921.244	817.037	-0.0132	0.2072	-0.00002
STORY3	D3	EQXPOS	538	1921.489	813.648	0.2335	-0.0064	0.00001
STORY3	D3	EQXNEG	538	1921.489	813.648	0.2366	-0.0041	0.00003
STORY3	D3	EQYPOS	538	1921.489	813.648	-0.0020	0.1536	0.00004
STORY3	D3	EQYNEG	538	1921.489	813.648	-0.0086	0.1488	-0.00001
STORY2	D2	EQXPOS	539	1919.603	822.664	0.1274	-0.0028	0.00000
STORY2	D2	EQXNEG	539	1919.603	822.664	0.1289	-0.0017	0.00002
STORY2	D2	EQYPOS	539	1919.603	822.664	-0.0010	0.0948	0.00002
STORY2	D2	EQYNEG	539	1919.603	822.664	-0.0041	0.0924	-0.00001
STORY1	D1	EQXPOS	540	1925.110	941.942	0.0362	-0.0002	0.00000
STORY1	D1	EQXNEG	540	1925.110	941.942	0.0360	0.0001	0.00000
STORY1	D1	EQYPOS	540	1925.110	941.942	-0.0007	0.0360	0.00000
STORY1	D1	EQYNEG	540	1925.110	941.942	-0.0003	0.0354	0.00000
P1	DP1	EQXPOS	541	1918.927	915.478	0.0179	-0.0001	0.00000
P1	DP1	EQXNEG	541	1918.927	915.478	0.0179	0.0001	0.00000
P1	DP1	EQYPOS	541	1918.927	915.478	-0.0002	0.0199	0.00000
P1	DP1	EQYNEG	541	1918.927	915.478	-0.0001	0.0196	0.00000
P2	DP2	EQXPOS	542	1918.603	911.148	0.0074	0.0000	0.00000
P2	DP2	EQXNEG	542	1918.603	911.148	0.0073	0.0000	0.00000
P2	DP2	EQYPOS	542	1918.603	911.148	-0.0001	0.0080	0.00000
P2	DP2	EQYNEG	542	1918.603	911.148	0.0000	0.0080	0.00000

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Summary Output Data - Section Designer Pier Section Check (UBC97)

Story Label	Pier Label	Station Location	Pier Section	D/C Ratio	Av 2-Dir in^2/ft	B-Zone Length-2	Av 3-Dir in^2/ft	B-Zone Length-3
STORY1	P01A	Top	PSEC32	0.035	0.966	Not Needed	N/A	N/A
		Bottom	PSEC32	0.122	0.956	131.400	N/A	N/A
P1	P01A	Top	PSEC34	0.055	0.553	248.400	N/A	N/A
		Bottom	PSEC34	0.062	0.553	248.400	N/A	N/A
P2	P01A	Top	PSEC34	0.071	0.540	248.400	N/A	N/A
		Bottom	PSEC34	0.078	0.540	248.400	N/A	N/A
STORY1	P01B	Top	PSEC33	0.027	0.734	Not Needed	N/A	N/A
		Bottom	PSEC33	0.269	0.733	Not Needed	N/A	N/A
ROOF	P02	Top	PSEC01	0.268	0.975	Not Needed	N/A	N/A
		Bottom	PSEC01	0.380	0.965	Not Needed	N/A	N/A
STORY4	P02	Top	PSEC02	0.163	1.730	Not Needed	N/A	N/A
		Bottom	PSEC02	0.499	1.717	Not Needed	N/A	N/A
STORY3	P02	Top	PSEC03	0.079	2.209	Not Needed	N/A	N/A
		Bottom	PSEC03	0.564	2.193	Not Needed	N/A	N/A
STORY2	P02	Top	PSEC05	0.059	2.339	Not Needed	N/A	N/A
		Bottom	PSEC05	0.960	2.320	Not Needed	N/A	N/A
STORY1	P02	Top	PSEC04	0.429	0.720	54.000	N/A	N/A
		Bottom	PSEC04	0.203	0.720	54.000	N/A	N/A
P1	P02	Top	PSEC05	0.313	0.720	54.000	N/A	N/A
		Bottom	PSEC05	0.207	0.720	54.000	N/A	N/A
P2	P02	Top	PSEC01A	0.234	0.720	54.000	N/A	N/A
		Bottom	PSEC01A	0.302	0.720	54.000	N/A	N/A
ROOF	P03	Top	PSEC06	0.363	0.360	Not Needed	N/A	N/A
		Bottom	PSEC06	0.474	0.360	Not Needed	N/A	N/A
STORY4	P03	Top	PSEC06A	0.393	0.540	Not Needed	N/A	N/A
		Bottom	PSEC06A	0.794	0.540	Not Needed	N/A	N/A
STORY3	P03	Top	PSEC07	0.435	0.720	Not Needed	N/A	N/A
		Bottom	PSEC07	0.879	0.720	Not Needed	N/A	N/A
STORY2	P03	Top	PSEC08A	0.462	0.720	40.500	N/A	N/A
		Bottom	PSEC08A	0.970	0.720	40.500	N/A	N/A
STORY1	P03	Top	PSEC09	0.928	0.720	Not Needed	N/A	N/A
		Bottom	PSEC09	0.616	0.720	Not Needed	N/A	N/A
P1	P03	Top	PSEC08A	0.597	0.720	40.500	N/A	N/A
		Bottom	PSEC08A	0.481	0.720	40.500	N/A	N/A
P2	P03	Top	PSEC10	0.528	0.720	40.500	N/A	N/A
		Bottom	PSEC10	0.607	0.720	40.500	N/A	N/A
ROOF	P04	Top	PSEC06	0.038	0.360	Not Needed	N/A	N/A
		Bottom	PSEC06	0.250	0.360	Not Needed	N/A	N/A
STORY4	P04	Top	PSEC06A	0.053	0.540	Not Needed	N/A	N/A
		Bottom	PSEC06A	0.453	0.540	Not Needed	N/A	N/A
STORY3	P04	Top	PSEC07	0.144	0.720	Not Needed	N/A	N/A
		Bottom	PSEC07	0.514	0.720	Not Needed	N/A	N/A
STORY2	P04	Top	PSEC08	0.226	0.720	Not Needed	N/A	N/A
		Bottom	PSEC08	0.694	0.720	40.500	N/A	N/A
STORY1	P04	Top	PSEC09	0.608	0.720	Not Needed	N/A	N/A
		Bottom	PSEC09	0.312	0.720	Not Needed	N/A	N/A

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Engineers Northwest

Summary Output Data - Section Designer Pier Section Check (UBC97)

Story Label	Pier Label	Station Location	Pier Section	D/C Ratio	Av 2-Dir in^2/ft	B-Zone Length-2	Av 3-Dir in^2/ft	B-Zone Length-3
P1	P04	Top	PSEC08A	0.288	0.720	40.500	N/A	N/A
		Bottom	PSEC08A	0.227	0.720	40.500	N/A	N/A
P2	P04	Top	PSEC10	0.219	0.720	40.500	N/A	N/A
		Bottom	PSEC10	0.312	0.720	40.500	N/A	N/A
ROOF	P05	Top	PSEC01B	0.253	0.482	Not Needed	N/A	N/A
		Bottom	PSEC01B	0.435	0.482	Not Needed	N/A	N/A
STORY4	P05	Top	PSEC02A	0.153	1.090	Not Needed	N/A	N/A
		Bottom	PSEC02A	0.433	1.078	Not Needed	N/A	N/A
STORY3	P05	Top	PSEC03	0.240	1.469	Not Needed	N/A	N/A
		Bottom	PSEC03	0.554	1.469	Not Needed	N/A	N/A
STORY2	P05	Top	PSEC03A	0.420	1.686	54.000	N/A	N/A
		Bottom	PSEC03A	0.774	1.686	54.000	N/A	N/A
STORY1	P05	Top	PSEC04	0.921	0.720	Not Needed	N/A	N/A
		Bottom	PSEC04	0.481	0.720	Not Needed	N/A	N/A
P1	P05	Top	PSEC05	0.344	0.720	54.000	N/A	N/A
		Bottom	PSEC05	0.252	0.720	54.000	N/A	N/A
P2	P05	Top	PSEC01A	0.275	0.720	54.000	N/A	N/A
		Bottom	PSEC01A	0.348	0.720	54.000	N/A	N/A
STORY1	P06A	Top	PSEC35	0.038	1.041	Not Needed	N/A	N/A
		Bottom	PSEC35	0.062	1.036	Not Needed	N/A	N/A
P1	P06A	Top	PSEC36	0.323	0.540	40.500	N/A	N/A
		Bottom	PSEC36	0.552	0.540	40.500	N/A	N/A
P2	P06A	Top	PSEC34	0.069	0.540	Not Needed	N/A	N/A
		Bottom	PSEC34	0.076	0.540	Not Needed	N/A	N/A
P1	P06B	Top	PSEC37	0.067	0.782	157.500	N/A	N/A
		Bottom	PSEC37	0.105	0.782	157.500	N/A	N/A
STORY1	P07A	Top	PSEC38	0.016	0.454	Not Needed	N/A	N/A
		Bottom	PSEC38	0.018	0.454	Not Needed	N/A	N/A
P1	P07A	Top	PSEC38	0.037	0.360	Not Needed	N/A	N/A
		Bottom	PSEC38	0.044	0.360	Not Needed	N/A	N/A
P2	P07A	Top	PSEC40	0.058	0.360	153.900	N/A	N/A
		Bottom	PSEC40	0.065	0.360	153.900	N/A	N/A
STORY1	P07B	Top	PSEC39	0.019	0.758	Not Needed	N/A	N/A
		Bottom	PSEC39	0.048	0.754	Not Needed	N/A	N/A
STORY1	P07C	Top	PSEC39	0.017	0.734	167.400	N/A	N/A
		Bottom	PSEC39	0.052	0.731	167.400	N/A	N/A
STORY1	P07D	Top	PSEC38	0.021	0.453	Not Needed	N/A	N/A
		Bottom	PSEC38	0.023	0.453	Not Needed	N/A	N/A
P2	P07K	Top	PSEC41	0.084	0.360	36.000	N/A	N/A
		Bottom	PSEC41	0.108	0.360	36.000	N/A	N/A
P2	P07L	Top	PSEC42	0.432	0.360	Not Needed	N/A	N/A
		Bottom	PSEC42	0.475	0.360	9.000	N/A	N/A
P2	P07N	Top	PSEC41	0.075	0.360	36.000	N/A	N/A
		Bottom	PSEC41	0.076	0.360	36.000	N/A	N/A
P2	P07P	Top	PSEC43	0.102	0.360	16.500	N/A	N/A
		Bottom	PSEC43	0.208	0.360	16.500	N/A	N/A

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Engineers Northwest

Summary Output Data - Section Designer Pier Section Check (UBC97)

Story Label	Pier Label	Station Location	Pier Section	D/C Ratio	Av 2-Dir in^2/ft	B-Zone Length-2	Av 3-Dir in^2/ft	B-Zone Length-3
P2	P07Q	Top	PSEC44	0.563	0.360	3.600	N/A	N/A
		Bottom	PSEC44	0.588	0.360	3.600	N/A	N/A
P2	P07R	Top	PSEC45	0.328	0.360	3.900	N/A	N/A
		Bottom	PSEC45	0.376	0.360	3.900	N/A	N/A
P2	P07S	Top	PSEC40	0.060	0.360	153.900	N/A	N/A
		Bottom	PSEC40	0.069	0.360	153.900	N/A	N/A
ROOF	P08A	Top	PSEC11	0.135	0.360	Not Needed	N/A	N/A
		Bottom	PSEC11	0.366	0.360	38.700	N/A	N/A
STORY4	P08A	Top	PSEC11A	0.517	0.540	38.700	N/A	N/A
		Bottom	PSEC11A	0.973	0.540	38.700	N/A	N/A
STORY3	P08A	Top	PSEC12	0.639	0.720	38.700	N/A	N/A
		Bottom	PSEC12	0.988	0.720	38.700	N/A	N/A
STORY2	P08A	Top	PSEC13	0.675	0.720	38.700	N/A	N/A
		Bottom	PSEC13	0.972	0.826	38.700	N/A	N/A
STORY1	P08A	Top	PSEC14	0.969	0.957	41.491	N/A	N/A
		Bottom	PSEC14	0.700	0.957	41.929	N/A	N/A
P1	P08A	Top	PSEC13	0.621	0.720	42.030	N/A	N/A
		Bottom	PSEC13	0.567	0.720	42.466	N/A	N/A
P2	P08A	Top	PSEC15	0.914	0.720	45.336	N/A	N/A
		Bottom	PSEC15	0.903	0.720	45.804	N/A	N/A
ROOF	P08B	Top	PSEC16	0.067	0.360	51.300	N/A	N/A
		Bottom	PSEC16	0.343	0.360	51.300	N/A	N/A
STORY4	P08B	Top	PSEC17	0.172	0.581	51.300	N/A	N/A
		Bottom	PSEC17	0.683	0.581	51.300	N/A	N/A
STORY3	P08B	Top	PSEC18	0.267	0.720	51.300	N/A	N/A
		Bottom	PSEC18	0.539	0.720	51.300	N/A	N/A
STORY2	P08B	Top	PSEC18	0.531	0.720	51.300	N/A	N/A
		Bottom	PSEC18	0.794	0.720	51.300	N/A	N/A
STORY1	P08B	Top	PSEC19	0.759	1.172	Not Needed	N/A	N/A
		Bottom	PSEC19	0.390	1.172	Not Needed	N/A	N/A
P1	P08B	Top	PSEC18	0.404	0.720	51.300	N/A	N/A
		Bottom	PSEC18	0.236	0.720	51.300	N/A	N/A
P2	P08B	Top	PSEC17	0.442	0.540	51.300	N/A	N/A
		Bottom	PSEC17	0.441	0.540	51.300	N/A	N/A
ROOF	P08C	Top	PSEC20	0.241	0.360	17.100	N/A	N/A
		Bottom	PSEC20	0.137	0.360	17.100	N/A	N/A
STORY4	P08C	Top	PSEC20A	0.084	0.540	Not Needed	N/A	N/A
		Bottom	PSEC20A	0.238	0.540	Not Needed	N/A	N/A
STORY3	P08C	Top	PSEC21	0.102	0.720	Not Needed	N/A	N/A
		Bottom	PSEC21	0.215	0.720	17.100	N/A	N/A
STORY2	P08C	Top	PSEC22	0.128	0.720	17.100	N/A	N/A
		Bottom	PSEC22	0.395	0.720	17.100	N/A	N/A
STORY1	P08C	Top	PSEC23	0.333	0.720	17.100	N/A	N/A
		Bottom	PSEC23	0.174	0.720	17.100	N/A	N/A
P1	P08C	Top	PSEC22	0.198	0.720	17.100	N/A	N/A
		Bottom	PSEC22	0.204	0.720	17.100	N/A	N/A

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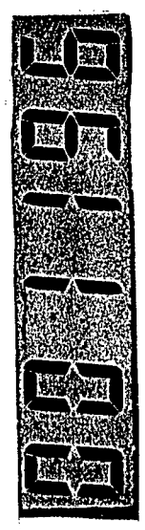

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Engineers Northwest

Summary Output Data - Section Designer Pier Section Check (UBC97)

Story Label	Pier Label	Station Location	Pier Section	D/C Ratio	Av 2-Dir in^2/ft	B-Zone Length-2	Av 3-Dir in^2/ft	B-Zone Length-3
P2	P08C	Top	PSEC24	0.262	0.720	17.100	N/A	N/A
		Bottom	PSEC24	0.269	0.720	17.100	N/A	N/A
ROOF	P08D	Top	PSEC25	0.777	0.360	Not Needed	N/A	N/A
		Bottom	PSEC25	0.873	0.360	Not Needed	N/A	N/A
STORY4	P08D	Top	PSEC25A	0.609	0.540	20.700	N/A	N/A
		Bottom	PSEC25A	0.853	0.540	20.700	N/A	N/A
STORY3	P08D	Top	PSEC26	0.735	0.720	20.700	N/A	N/A
		Bottom	PSEC26	0.950	0.720	20.700	N/A	N/A
STORY2	P08D	Top	PSEC27	0.600	0.720	20.700	N/A	N/A
		Bottom	PSEC27	0.893	1.085	20.979	N/A	N/A
STORY1	P08D	Top	PSEC28	0.856	1.110	22.623	N/A	N/A
		Bottom	PSEC28	0.518	0.973	22.841	N/A	N/A
P1	P08D	Top	PSEC27	0.454	0.720	22.918	N/A	N/A
		Bottom	PSEC27	0.438	0.720	23.136	N/A	N/A
P2	P08D	Top	PSEC29	0.745	0.720	25.306	N/A	N/A
		Bottom	PSEC29	0.716	0.720	25.547	N/A	N/A
ROOF	P09A	Top	PSEC11	0.148	0.360	38.700	N/A	N/A
		Bottom	PSEC11	0.326	0.360	38.700	N/A	N/A
STORY4	P09A	Top	PSEC11A	0.466	0.540	38.700	N/A	N/A
		Bottom	PSEC11A	0.921	0.540	38.700	N/A	N/A
STORY3	P09A	Top	PSEC12	0.581	0.720	38.700	N/A	N/A
		Bottom	PSEC12	0.949	0.720	38.700	N/A	N/A
STORY2	P09A	Top	PSEC13	0.637	0.720	38.700	N/A	N/A
		Bottom	PSEC13	0.994	0.998	38.700	N/A	N/A
STORY1	P09A	Top	PSEC14	0.993	1.274	41.514	N/A	N/A
		Bottom	PSEC14	0.633	1.262	41.952	N/A	N/A
P1	P09A	Top	PSEC13	0.580	0.720	42.076	N/A	N/A
		Bottom	PSEC13	0.549	0.720	42.512	N/A	N/A
P2	P09A	Top	PSEC15	0.882	0.720	44.981	N/A	N/A
		Bottom	PSEC15	0.871	0.720	45.349	N/A	N/A
ROOF	P09B	Top	PSEC16	0.202	0.472	51.300	N/A	N/A
		Bottom	PSEC16	0.492	0.472	Not Needed	N/A	N/A
STORY4	P09B	Top	PSEC17	0.334	0.757	51.300	N/A	N/A
		Bottom	PSEC17	0.974	0.757	51.300	N/A	N/A
STORY3	P09B	Top	PSEC18	0.345	0.928	51.300	N/A	N/A
		Bottom	PSEC18	0.644	0.928	51.300	N/A	N/A
STORY2	P09B	Top	PSEC18	0.670	0.775	51.300	N/A	N/A
		Bottom	PSEC18	0.982	1.034	51.300	N/A	N/A
STORY1	P09B	Top	PSEC19	0.969	1.525	51.300	N/A	N/A
		Bottom	PSEC19	0.542	1.525	51.300	N/A	N/A
P1	P09B	Top	PSEC18	0.558	0.720	51.300	N/A	N/A
		Bottom	PSEC18	0.355	0.720	51.300	N/A	N/A
P2	P09B	Top	PSEC17	0.898	0.540	51.672	N/A	N/A
		Bottom	PSEC17	0.859	0.540	52.527	N/A	N/A
ROOF	P09C	Top	PSEC20	0.297	0.360	Not Needed	N/A	N/A
		Bottom	PSEC20	0.322	0.360	Not Needed	N/A	N/A

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Engineers Northwest

Summary Output Data - Section Designer Pier Section Check (UBC97)

Story Label	Pier Label	Station Location	Pier Section	D/C Ratio	Av 2-Dir in^2/ft	B-Zone Length-2	Av 3-Dir in^2/ft	B-Zone Length-3
STORY4	P09C	Top	PSEC20A	0.139	0.540	Not Needed	N/A	N/A
		Bottom	PSEC20A	0.777	0.540	17.100	N/A	N/A
STORY3	P09C	Top	PSEC21	0.288	0.720	Not Needed	N/A	N/A
		Bottom	PSEC21	0.949	0.720	17.100	N/A	N/A
STORY2	P09C	Top	PSEC22	0.312	0.720	17.100	N/A	N/A
		Bottom	PSEC22	0.842	0.720	17.100	N/A	N/A
STORY1	P09C	Top	PSEC23	0.767	0.720	17.100	N/A	N/A
		Bottom	PSEC23	0.297	0.720	17.100	N/A	N/A
P1	P09C	Top	PSEC22	0.225	0.720	17.100	N/A	N/A
		Bottom	PSEC22	0.222	0.720	17.100	N/A	N/A
P2	P09C	Top	PSEC24	0.573	0.720	17.100	N/A	N/A
		Bottom	PSEC24	0.554	0.720	17.110	N/A	N/A
ROOF	P09D	Top	PSEC25	0.694	0.360	Not Needed	N/A	N/A
		Bottom	PSEC25	0.661	0.360	Not Needed	N/A	N/A
STORY4	P09D	Top	PSEC25A	0.582	0.540	20.700	N/A	N/A
		Bottom	PSEC25A	0.561	0.540	20.700	N/A	N/A
STORY3	P09D	Top	PSEC26	0.734	0.720	20.700	N/A	N/A
		Bottom	PSEC26	0.725	0.720	20.700	N/A	N/A
STORY2	P09D	Top	PSEC27	0.581	0.720	20.896	N/A	N/A
		Bottom	PSEC27	0.691	0.852	21.223	N/A	N/A
STORY1	P09D	Top	PSEC28	0.675	0.893	22.897	N/A	N/A
		Bottom	PSEC28	0.499	0.893	23.115	N/A	N/A
P1	P09D	Top	PSEC27	0.462	0.720	23.107	N/A	N/A
		Bottom	PSEC27	0.440	0.720	23.325	N/A	N/A
P2	P09D	Top	PSEC29	0.737	0.720	25.048	N/A	N/A
		Bottom	PSEC29	0.714	0.720	25.290	N/A	N/A
STORY1	P10A	Top	PSEC30	0.048	0.713	Not Needed	N/A	N/A
		Bottom	PSEC30	0.075	0.718	Not Needed	N/A	N/A
P1	P10A	Top	PSEC30	0.076	0.360	108.000	N/A	N/A
		Bottom	PSEC30	0.078	0.360	108.000	N/A	N/A
P2	P10A	Top	PSEC30	0.105	0.360	108.000	N/A	N/A
		Bottom	PSEC30	0.102	0.360	108.000	N/A	N/A
STORY1	P10B	Top	PSEC30	0.054	0.623	108.000	N/A	N/A
		Bottom	PSEC30	0.106	0.626	Not Needed	N/A	N/A
P1	P10B	Top	PSEC30	0.075	0.360	Not Needed	N/A	N/A
		Bottom	PSEC30	0.094	0.360	Not Needed	N/A	N/A
P2	P10B	Top	PSEC30	0.089	0.360	108.000	N/A	N/A
		Bottom	PSEC30	0.107	0.360	108.000	N/A	N/A
STORY1	P10C	Top	PSEC31	0.054	0.748	Not Needed	N/A	N/A
		Bottom	PSEC31	0.064	0.740	275.400	N/A	N/A
P1	P10C	Top	PSEC31	0.095	0.360	Not Needed	N/A	N/A
		Bottom	PSEC31	0.103	0.360	Not Needed	N/A	N/A
P2	P10C	Top	PSEC31	0.111	0.360	Not Needed	N/A	N/A
		Bottom	PSEC31	0.118	0.360	275.400	N/A	N/A

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Engineers Northwest

Spandrel Output Data - Spandrel Design (UBC97)

Story Label	Spandrel Label	Station Location	L/d Ratio	Shear Phi Vc	M(top) in^2	M(bot) in^2	Av in^2/ft	Ah in^2/ft	Avd in^2	
STORY1	S06A	Left	4.762	103.277	0.601	0.656	1.195	1.195	L/d >= 4	
		Right	4.762	103.277	0.678	0.627	1.278	1.278	L/d >= 4	
P1	S06A	Left	11.111	44.262	0.662	0.390	1.363	1.363	L/d >= 4	
		Right	11.111	44.262	0.721	0.464	1.397	1.397	L/d >= 4	
P2	S06B	Left	3.333	147.539	0.200	0.787	1.368	1.368	31.841	
		Right	3.333	147.539	0.234	0.564	0.808	0.808	22.065	
P2	S07N	Left	1.389	26.229	0.810	0.599	0.318	0.360	1.384	
		Right	1.389	26.229	0.571	0.655	0.298	0.360	1.339	
P2	S07P	Left	1.389	26.229	0.557	0.434	0.260	0.360	1.255	
		Right	1.389	26.229	0.318	0.299	0.317	0.360	1.382	

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ENW ENGINEERS NORTHWEST, INC., P.S. ~ STRUCTURAL ENGINEERS

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PROJECT # 02110 PROJECT INS TUKWILA DATE 4/7/03

SUBJECT LATERAL SHEET L28 OF

DIAPHRAGM SHEAR BY TDM

FOR #4 @ 18" (MAX SPACING FOR DIAPHRAGM)

$$\rho = \frac{.2\text{in}^2}{(8.5")(18")} = .00131$$

FOR ALL DIAPHRAGM SEGMENTS, $h/\ell < 1.0$

$$V_N = A_{cv}\left(\alpha_c\sqrt{f'_c} + \rho f_y\right)$$

$\alpha_c = 3.0$, $h/\ell \le 1.5$
$A_{cv} = (8.5\text{in})(12"/\text{ft}) = 102\text{in}^2/\text{ft}$
$f'_c = 5000\text{ PSI}$
$f_y = 60000\text{ PSI}$

$V_N = (102\text{in}^2/\text{ft})\left(3(5000)^{1/2} + (.00131)(60000)\right)$

$V_N = 2165\#/\text{ft} = 21.6\text{k}/\text{ft}$

$\phi V_N = (.6)(21.6) = 12.98\text{k}/\text{ft}$

AT 1ST FLOOR
12" SLABS W/ #7 @ 12"

$$\rho = \frac{.6}{(12)(12)} = .00417$$

$\phi V_N = (.6)(12")(12"/\text{ft})\left[3(5000)^{1/2} + (.00417)(60000)\right]/1000$
$\phi V_N = 39.9\text{k}/\text{ft}$

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EXHIBIT 3

Y - Direction (+) eccentricity

P02		
Level	V_i	V_i-V_{i+1}
Roof	439	439
4th	857	418
3rd	1181	324
2nd	1328	147
1st	409	-919
P1	272	-137
P2	466	194

P03		
Level	V_i	V_i-V_{i+1}
Roof	163	163
4th	347	184
3rd	522	175
2nd	782	260
1st	-457	-1239
P1	-80	377
P2	256	336

P04		
Level	V_i	V_i-V_{i+1}
Roof	156	156
4th	345	189
3rd	504	159
2nd	759	255
1st	-541	-1300
P1	-133	408
P2	219	352

P05		
Level	V_i	V_i-V_{i+1}
Roof	654	654
4th	1302	648
3rd	1901	599
2nd	2108	207
1st	-1182	-3290
P1	-262	920
P2	318	580

Y - Direction (-) eccentricity

P02		
Level	V_i	V_i-V_{i+1}
Roof	693	693
4th	1402	709
3rd	1958	556
2nd	2184	226
1st	-267	-2451
P1	-34	233
P2	433	467

P03		
Level	V_i	V_i-V_{i+1}
Roof	164	164
4th	339	175
3rd	543	204
2nd	846	303
1st	-523	-1369
P1	-110	413
P2	259	369

P04		
Level	V_i	V_i-V_{i+1}
Roof	133	133
4th	280	147
3rd	420	140
2nd	651	231
1st	-399	-1050
P1	-84	315
P2	230	314

P05		
Level	V_i	V_i-V_{i+1}
Roof	430	430
4th	840	410
3rd	1192	352
2nd	1290	98
1st	-333	-1623
P1	67	400
P2	369	302

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X - Direction (+) eccentricity

P08A		
Level	V_i	V_i-V_{i+1}
Roof	132	132
4th	359	227
3rd	542	183
2nd	761	219
1st	-1237	-1998
P1	-454	783
P2	173	627

P08B		
Level	V_i	V_i-V_{i+1}
Roof	372	372
4th	753	381
3rd	1156	403
2nd	1091	-65
1st	-1648	-2739
P1	-739	909
P2	163	902

P08C		
Level	V_i	V_i-V_{i+1}
Roof	53	53
4th	69	16
3rd	58	-11
2nd	164	106
1st	-229	-393
P1	-34	195
P2	79	113

P08D		
Level	V_i	V_i-V_{i+1}
Roof	55	55
4th	152	97
3rd	195	43
2nd	361	166
1st	-563	-924
P1	-174	389
P2	99	273

P09A		
Level	V_i	V_i-V_{i+1}
Roof	129	129
4th	355	226
3rd	539	184
2nd	786	247
1st	-1281	-2067
P1	-449	832
P2	168	617

P09B		
Level	V_i	V_i-V_{i+1}
Roof	418	418
4th	813	395
3rd	1236	423
2nd	1166	-70
1st	-1684	-2850
P1	-735	949
P2	154	889

P09C		
Level	V_i	V_i-V_{i+1}
Roof	77	77
4th	121	44
3rd	136	15
2nd	243	107
1st	-311	-554
P1	-102	209
P2	50	152

P09D		
Level	V_i	V_i-V_{i+1}
Roof	59	59
4th	156	97
3rd	198	42
2nd	378	180
1st	-592	-970
P1	-171	421
P2	100	271

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X - Direction (-) eccentricity

P08A		
Level	V_i	V_i-V_{i+1}
Roof	133	133
4th	356	223
3rd	537	181
2nd	728	191
1st	-1187	-1915
P1	-438	749
P2	170	608

P08B		
Level	V_i	V_i-V_{i+1}
Roof	365	365
4th	736	371
3rd	1127	391
2nd	1041	-86
1st	-1583	-2624
P1	-712	871
P2	161	873

P08C		
Level	V_i	V_i-V_{i+1}
Roof	51	51
4th	66	15
3rd	57	-9
2nd	155	98
1st	-219	-374
P1	-33	186
P2	77	110

P08D		
Level	V_i	V_i-V_{i+1}
Roof	70	70
4th	177	107
3rd	242	65
2nd	371	129
1st	-558	-929
P1	-189	369
P2	91	280

P09A		
Level	V_i	V_i-V_{i+1}
Roof	127	127
4th	355	228
3rd	541	186
2nd	814	273
1st	-1329	-2143
P1	-457	872
P2	166	623

P09B		
Level	V_i	V_i-V_{i+1}
Roof	423	423
4th	826	403
3rd	1257	431
2nd	1209	-48
1st	-1746	-2955
P1	-752	994
P2	151	903

P09C		
Level	V_i	V_i-V_{i+1}
Roof	80	80
4th	127	47
3rd	145	18
2nd	257	112
1st	-330	-587
P1	-109	221
P2	47	156

P09D		
Level	V_i	V_i-V_{i+1}
Roof	43	43
4th	131	88
3rd	153	22
2nd	369	216
1st	-601	-970
P1	-156	445
P2	104	260

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Y - Direction (+) eccentricity

P01		
Level	V_i	V_i-V_{i+1}
1st A	2316	2316
1st B	975	975
P1	3313	22
P2	2462	-851

P06		
Level	V_i	V_i-V_{i+1}
1st	4581	4581
P1 A	529	-165
P1 B	2961	-926
P2	3016	-474

Y - Direction (-) eccentricity

P01		
Level	V_i	V_i-V_{i+1}
1st A	2759	2759
1st B	1177	1177
P1	3690	-246
P2	2983	-707

P06		
Level	V_i	V_i-V_{i+1}
1st	3693	3693
P1 A	434	-126
P1 B	2462	-671
P2	2461	-435

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X - Direction (+) eccentricity

P07		
Level	V_i	V_i-V_{i+1}
1st	6141	6141
P1	4841	-1300
P2	2565	-2276

P10A		
Level	V_i	V_i-V_{i+1}
1st	1628	1628
P1	958	-670
P2	690	-268

P10B		
Level	V_i	V_i-V_{i+1}
1st	1608	1608
P1	952	-656
P2	689	-263

P10C		
Level	V_i	V_i-V_{i+1}
1st	4450	4450
P1	2658	-1792
P2	1837	-821

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X - Direction (-) eccentricity

P07		
Level	V_i	V_i-V_{i+1}
1st	5842	5842
P1	4588	-1254
P2	2416	-2172

P10A		
Level	V_i	V_i-V_{i+1}
1st	1701	1701
P1	1012	-689
P2	727	-285

P10B		
Level	V_i	V_i-V_{i+1}
1st	1675	1675
P1	1003	-672
P2	726	-277

P10C		
Level	V_i	V_i-V_{i+1}
1st	4628	4628
P1	2789	-1839
P2	1931	-858

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Maximum Drag Loads						
	Pier					
Level	P01	P02	P03	P04	P05	P06
Roof		693	164	156	654	
4th		709	184	189	648	
3rd		556	204	159	599	
2nd P1A→	2759	226	303	255	207	4581 ← P6 @ 1st
1st P1B	1177	2451	1369	1300	3290	165 ← P6A @ P1
P1	246	233	413	408	920	926 ← P6A @ P1
P2	851	467	369	352	580	474

Maximum Drag Loads					
	Pier				
Level	P07	P08A	P08B	P08C	P08D
Roof		133	372	53	70
4th		227	381	16	107
3rd		183	403	11	65
2nd		219	86	106	166
1st	6141	1998	2739	393	929
P1	1300	783	909	195	389
P2	2276	627	902	113	280

Maximum Drag Loads							
	Pier						
Level	P09A	P09B	P09C	P09D	P10A	P10B	P10C
Roof	129	423	80	59			
4th	228	403	47	97			
3rd	186	431	18	42			
2nd	273	70	112	216			
1st	2143	2955	587	970	1701	1675	4628
P1	872	994	221	445	689	672	1839
P2	623	903	156	271	285	277	858

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RECEIVED

ΦV_N = 12.98 KLF - typical (except 1st floor)
ΦV_N = 39.90 KLF - at first floor

ΦV_N								
	P01A				P01B			
Level	L	ΦV_N	V_U		L	ΦV_N	V_U	
1st	72.50	2893	2759	OK	37.50	1496	1177	OK
P1	137.00	1778	246	OK				
P2	137.00	1778	851	OK				

ΦV_N								
	P02				P03			
Level	L	ΦV_N	V_U		L	ΦV_N	V_U	
Roof	33.00	428	693	NG	24.00	312	164	OK
4th	34.00	441	709	NG	24.50	318	184	OK
3rd	35.00	454	556	NG	25.00	325	204	OK
2nd	35.00	454	226	OK	25.00	325	303	OK
1st	35.00	1397	2451	NG	25.00	998	1369	NG
P1	35.00	454	233	OK	25.00	325	413	NG
P2	35.00	454	467	NG	25.00	325	369	NG

ΦV_N								
	P04				P05			
Level	L	ΦV_N	V_U		L	ΦV_N	V_U	
Roof	24.50	318	156	OK	41.00	532	654	NG
4th	25.00	325	189	OK	42.00	545	648	NG
3rd	25.50	331	159	OK	43.00	558	599	NG
2nd	25.50	331	255	OK	43.00	558	207	OK
1st	25.50	1017	1300	NG	43.00	1716	3290	NG
P1	25.50	331	408	NG	43.00	558	920	NG
P2	25.50	331	352	NG	43.00	558	580	NG

ΦV_N								
	P06A				P06B			
Level	L	ΦV_N	V_U		L	ΦV_N	V_U	
1st	112.00	4469	4581	NG				
P1	22.00	286	165	OK	87.00	1129	926	OK
P2	137.00	1778	474	OK				

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ΦV_N				
	P07			
Level	L	ΦV_N	V_U	
1st	272.00	10853	6141	OK
P1	272.00	3531	1300	OK
P2	272.00	3531	2276	OK

ΦV_N								
	P08A				P08B			
Level	L	ΦV_N	V_U		L	ΦV_N	V_U	
Roof	32.00	415	133	OK	57.00	740	372	OK
4th	32.00	415	227	OK	57.00	740	381	OK
3rd	32.00	415	183	OK	57.00	740	403	OK
2nd	32.00	415	219	OK	57.00	740	86	OK
1st	32.00	1277	1998	NG	57.00	2274	2739	NG
P1	32.00	415	783	NG	57.00	740	909	NG
P2	32.00	415	627	NG	57.00	740	902	NG

ΦV_N								
	P08C				P08D			
Level	L	ΦV_N	V_U		L	ΦV_N	V_U	
Roof	20.00	260	53	OK	12.50	162	70	OK
4th	20.50	266	16	OK	13.00	169	107	OK
3rd	21.00	273	11	OK	13.50	175	65	OK
2nd	21.00	273	106	OK	13.50	175	166	OK
1st	21.00	838	393	OK	13.50	539	929	NG
P1	21.00	273	195	OK	13.50	175	389	NG
P2	21.00	273	113	OK	13.50	175	280	NG

ΦV_N								
	P09A				P09B			
Level	L	ΦV_N	V_U		L	ΦV_N	V_U	
Roof	41.00	532	129	OK	46.50	604	423	OK
4th	41.00	532	228	OK	46.50	604	403	OK
3rd	41.00	532	186	OK	46.50	604	431	OK
2nd	41.00	532	273	OK	46.50	604	70	OK
1st	41.00	1636	2143	NG	46.50	1855	2955	NG
P1	41.00	532	872	NG	46.50	604	994	NG
P2	41.00	532	623	NG	46.50	604	903	NG

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ΦV_N								
	P09C				P09D			
Level	L	ΦV_N	V_U		L	ΦV_N	V_U	
Roof	11.50	149	80	OK	24.00	312	59	OK
4th	12.00	156	47	OK	24.50	318	97	OK
3rd	12.50	162	18	OK	25.00	325	42	OK
2nd	12.50	162	112	OK	25.00	325	216	OK
1st	12.50	499	587	NG	25.00	998	970	OK
P1	12.50	162	221	NG	25.00	325	445	NG
P2	12.50	162	156	OK	25.00	325	271	OK

ΦV_N								
	P10A				P10B			
Level	L	ΦV_N	V_U		L	ΦV_N	V_U	
1st	60.50	2414	1701	OK	60.50	2414	1675	OK
P1	60.50	785	689	OK	60.50	785	672	OK
P2	60.50	785	285	OK	60.50	785	277	OK

ΦV_N				
	P10C			
Level	L	ΦV_N	V_U	
1st	151.00	6025	4628	OK
P1	151.00	1960	1839	OK
P2	151.00	1960	858	OK

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
ROOF	P02	EQYPOS	Top	-0.82	439.30	-0.10	46.798	8.722	-28390.236
			Bottom	-0.82	439.30	-0.10	46.798	-7.086	40151.000
ROOF	P03	EQYPOS	Top	-38.36	163.19	0.78	60.435	-72.904	-10167.900
			Bottom	-38.36	163.19	0.78	60.435	48.280	15289.820
ROOF	P04	EQYPOS	Top	10.39	156.15	0.71	174.481	-100.369	-7377.111
			Bottom	-21.19	157.95	0.92	139.618	72.094	12939.371
ROOF	P05	EQYPOS	Top	-6.82	654.04	0.85	-71.586	-77.490	-38341.465
			Bottom	-6.82	654.04	0.85	-71.586	55.424	63688.758
ROOF	P08A	EQYPOS	Top	-75.21	-16.00	4.02	65.116	-350.703	950.877
			Bottom	-75.21	-16.00	4.02	65.116	275.886	-1544.971
ROOF	P08B	EQYPOS	Top	-18.65	-31.89	13.96	355.549	-1335.819	1783.696
			Bottom	-18.65	-31.89	13.96	355.549	841.967	-3190.441
ROOF	P08C	EQYPOS	Top	-22.22	-17.39	10.83	149.527	-971.437	1717.051
			Bottom	-22.22	-17.39	10.83	149.527	717.370	-995.535
ROOF	P08D	EQYPOS	Top	-96.03	93.17	4.30	60.370	-388.272	-6796.955
			Bottom	-96.03	93.17	4.30	60.370	282.398	7738.370
ROOF	P09A	EQYPOS	Top	76.34	5.15	3.97	23.215	-351.290	-699.055
			Bottom	76.34	5.15	3.97	23.215	268.435	104.023
ROOF	P09B	EQYPOS	Top	55.34	44.37	5.07	-52.606	-469.325	-3530.145
			Bottom	55.34	44.37	5.07	-52.606	321.282	3391.625
ROOF	P09C	EQYPOS	Top	10.74	29.04	3.33	79.909	-198.852	-1114.505
			Bottom	42.32	29.24	1.52	-15.996	98.792	1675.945
ROOF	P09D	EQYPOS	Top	102.59	-98.96	4.76	73.142	-436.087	7339.340
			Bottom	102.59	-98.96	4.76	73.142	306.836	-8098.247
STORY4	P02	EQYPOS	Top	3.50	856.70	0.07	256.941	11.894	-38156.909
			Bottom	3.50	856.70	0.07	256.941	22.786	95489.510
STORY4	P03	EQYPOS	Top	-191.55	346.53	0.62	175.226	-52.022	-11009.224
			Bottom	-191.55	346.53	0.62	175.226	45.132	43048.910
STORY4	P04	EQYPOS	Top	-40.85	345.03	-2.63	798.978	-23.160	-2026.545
			Bottom	-120.31	349.22	1.06	295.076	97.938	41704.753
STORY4	P05	EQYPOS	Top	-16.42	1302.18	1.40	-301.600	-104.041	-41246.509
			Bottom	-16.42	1302.18	1.40	-301.600	115.087	161893.437
STORY4	P08A	EQYPOS	Top	-293.21	-49.64	6.95	174.695	-552.968	721.763
			Bottom	-293.21	-49.64	6.95	174.695	531.020	-7041.303
STORY4	P08B	EQYPOS	Top	-40.36	-75.99	13.98	481.061	-1108.868	-1199.188
			Bottom	-40.36	-75.99	13.98	481.061	1071.726	-13051.937

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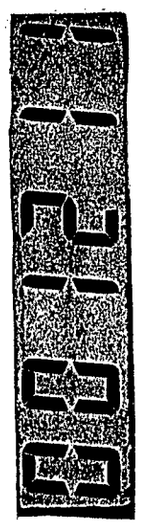

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
STORY4	P08C	EQYPOS							
			Top	-55.37	-18.27	14.70	349.440	-1269.442	1311.885
			Bottom	-55.37	-18.27	14.70	349.440	1023.296	-1538.671
STORY4	P08D	EQYPOS							
			Top	-377.28	145.33	9.01	14.332	-693.226	-11679.778
			Bottom	-377.28	145.33	9.01	14.332	713.032	10991.602
STORY4	P09A	EQYPOS							
			Top	290.27	18.12	6.50	131.471	-512.201	-1809.373
			Bottom	290.27	18.12	6.50	131.471	501.759	1018.707
STORY4	P09B	EQYPOS							
			Top	228.88	79.92	8.57	181.745	-624.448	-6936.230
			Bottom	228.88	79.92	8.57	181.745	713.232	5540.712
STORY4	P09C	EQYPOS							
			Top	94.40	56.55	8.20	320.017	-360.675	-1798.637
			Bottom	173.87	60.24	4.01	86.419	284.578	3037.193
STORY4	P09D	EQYPOS							
			Top	392.93	-156.60	9.02	22.094	-694.640	12010.396
			Bottom	392.93	-156.60	9.02	22.094	712.275	-12418.729
STORY3	P02	EQYPOS							
			Top	5.16	1180.83	0.29	462.796	29.297	-37216.306
			Bottom	5.16	1180.83	0.29	462.796	74.271	146992.793
STORY3	P03	EQYPOS							
			Top	-483.44	522.13	0.73	376.901	-26.433	-1418.508
			Bottom	-483.44	522.13	0.73	376.901	86.781	80034.267
STORY3	P04	EQYPOS							
			Top	-186.41	504.34	-10.21	2069.276	207.769	20122.372
			Bottom	-322.90	513.82	0.50	609.505	104.617	81861.165
STORY3	P05	EQYPOS							
			Top	-37.26	1901.23	3.00	-1177.077	-188.366	-11763.382
			Bottom	-37.26	1901.23	3.00	-1177.077	279.128	284828.624
STORY3	P08A	EQYPOS							
			Top	-664.45	-71.36	11.37	355.055	-833.126	-3445.105
			Bottom	-664.45	-71.36	11.37	355.055	941.101	-14577.110
STORY3	P08B	EQYPOS							
			Top	-60.58	-108.94	11.04	654.673	-882.880	-11198.746
			Bottom	-60.58	-108.94	11.04	654.673	839.165	-28193.098
STORY3	P08C	EQYPOS							
			Top	-90.56	-17.78	15.77	590.666	-1261.110	837.674
			Bottom	-90.56	-17.78	15.77	590.666	1198.945	-1935.320
STORY3	P08D	EQYPOS							
			Top	-846.94	262.55	10.48	-218.875	-717.074	-21170.096
			Bottom	-846.94	262.55	10.48	-218.875	917.103	19788.312
STORY3	P09A	EQYPOS							
			Top	659.88	10.53	10.49	331.204	-770.190	-2292.590
			Bottom	659.88	10.53	10.49	331.204	866.847	-649.764
STORY3	P09B	EQYPOS							
			Top	540.31	102.04	7.36	569.921	-461.681	-12570.310
			Bottom	540.31	102.04	7.36	569.921	687.011	3347.974
STORY3	P09C	EQYPOS							
			Top	275.03	94.44	14.11	846.384	-390.140	-2970.457
			Bottom	411.53	105.14	4.64	320.825	323.192	5470.123
STORY3	P09D	EQYPOS							
			Top	883.05	-273.48	10.30	-212.606	-705.113	21050.251
			Bottom	883.05	-273.48	10.30	-212.606	901.690	-21612.354

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
STORY2	P02	EQYPOS	Top	23.66	1328.49	1.05	493.434	68.106	-22009.747
			Bottom	23.66	1328.49	1.05	493.434	257.245	217119.583
STORY2	P03	EQYPOS	Top	-919.12	782.33	0.54	350.033	42.377	17201.113
			Bottom	-919.12	782.33	0.54	350.033	140.018	159020.580
STORY2	P04	EQYPOS	Top	-460.68	759.23	-7.51	1811.399	337.955	51811.960
			Bottom	-635.87	757.38	1.91	263.016	286.680	165381.239
STORY2	P05	EQYPOS	Top	-30.17	2108.24	2.25	-269.876	-59.428	75174.162
			Bottom	-30.17	2108.24	2.25	-269.876	345.862	454657.121
STORY2	P08A	EQYPOS	Top	-1147.96	-94.72	16.26	339.054	-937.765	-10048.121
			Bottom	-1147.96	-94.72	16.26	339.054	1989.925	-27098.142
STORY2	P08B	EQYPOS	Top	-78.82	-107.72	26.70	573.918	-1019.661	-26579.898
			Bottom	-78.82	-107.72	26.70	573.918	3785.832	-45970.106
STORY2	P08C	EQYPOS	Top	-123.44	-24.55	16.25	321.779	-974.148	232.774
			Bottom	-123.44	-24.55	16.25	321.779	1951.061	-4196.892
STORY2	P08D	EQYPOS	Top	-1433.75	138.61	20.18	-27.499	-935.811	-20312.959
			Bottom	-1433.75	138.61	20.18	-27.499	2696.604	4636.832
STORY2	P09A	EQYPOS	Top	1124.95	41.60	15.47	319.936	-865.376	-4909.590
			Bottom	1124.95	41.60	15.47	319.936	1919.308	2678.726
STORY2	P09B	EQYPOS	Top	993.84	109.57	25.16	523.764	-964.084	-22742.358
			Bottom	993.84	109.57	25.16	523.764	3564.759	-3018.977
STORY2	P09C	EQYPOS	Top	583.58	83.89	15.01	406.947	-504.790	-4267.794
			Bottom	758.77	93.31	16.86	498.883	1637.963	2146.013
STORY2	P09D	EQYPOS	Top	1462.52	-152.30	19.83	-6.834	-909.163	17815.880
			Bottom	1462.52	-152.30	19.83	-6.834	2659.656	-9598.067
STORY1	P01A	EQYPOS	Top	-36.41	2315.74	8.33	-3245.430	-274.362	-16361.133
			Bottom	-109.04	2316.34	3.72	-1231.794	226.437	229794.824
STORY1	P01B	EQYPOS	Top	29.66	974.68	-7.33	-1592.346	245.304	-6967.963
			Bottom	120.54	973.44	-5.42	-1165.260	-183.344	89317.467
STORY1	P02	EQYPOS	Top	32.43	408.70	-3.05	-439.627	320.601	103022.650
			Bottom	32.43	408.70	-3.05	-439.627	-44.871	152066.751
STORY1	P03	EQYPOS	Top	-1085.40	-456.79	-0.68	-34.879	116.433	132131.992
			Bottom	-1085.40	-456.79	-0.68	-34.879	35.052	77317.629
STORY1	P04	EQYPOS	Top	-685.09	-540.79	-33.82	4530.525	437.260	150390.038
			Bottom	-621.04	-612.88	5.21	-744.805	349.217	86722.775
STORY1	P05	EQYPOS	Top	-17.00	-1182.43	-2.00	-357.197	246.686	371006.054
			Bottom	-17.00	-1182.43	-2.00	-357.197	6.708	229114.541

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
STORY1	P06A	EQYPOS							
			Top	20.93	4580.84	6.92	7512.039	-75.683	-43918.033
			Bottom	147.13	4580.39	5.51	6570.518	216.180	420726.498
STORY1	P07A	EQYPOS							
			Top	-63.77	-435.07	21.42	2383.972	-1068.741	7941.055
			Bottom	-63.77	-435.07	21.42	2383.972	-468.987	-4240.900
STORY1	P07B	EQYPOS							
			Top	-68.78	-22.32	6.51	348.925	-141.045	-26102.114
			Bottom	-68.78	-22.32	6.51	348.925	223.506	-27451.980
STORY1	P07C	EQYPOS							
			Top	-82.82	-375.76	7.31	-139.581	-199.992	33634.342
			Bottom	-82.82	-375.76	7.31	-139.581	209.217	12581.672
STORY1	P07D	EQYPOS							
			Top	-280.86	-434.57	23.10	1109.309	505.010	29139.032
			Bottom	-280.86	-434.57	23.10	1109.309	1336.711	13493.663
STORY1	P08A	EQYPOS							
			Top	-1471.73	125.20	-1.81	-12.100	859.282	-24019.309
			Bottom	-1471.73	125.20	-1.81	-12.100	641.896	-8994.739
STORY1	P08B	EQYPOS							
			Top	-90.30	189.67	-19.07	-56.077	2681.566	-45029.953
			Bottom	-90.30	189.67	-19.07	-56.077	392.593	-22168.945
STORY1	P08C	EQYPOS							
			Top	-143.54	19.59	-2.57	270.421	686.403	-2932.211
			Bottom	-143.54	19.59	-2.57	270.421	377.991	-581.228
STORY1	P08D	EQYPOS							
			Top	-1668.21	62.30	-25.36	302.692	2460.494	-11500.127
			Bottom	-1668.21	62.30	-25.36	302.692	-583.075	-4024.140
STORY1	P09A	EQYPOS							
			Top	1440.02	-11.08	-2.33	-42.612	924.329	-173.279
			Bottom	1440.02	-11.08	-2.33	-42.612	645.122	-1503.141
STORY1	P09B	EQYPOS							
			Top	1171.58	23.16	-30.16	-618.088	3367.497	-13351.845
			Bottom	1171.58	23.16	-30.16	-618.088	-251.115	-10572.107
STORY1	P09C	EQYPOS							
			Top	827.52	-71.45	-85.81	-4204.530	2559.022	-1548.696
			Bottom	763.47	-32.42	-13.72	-88.632	-318.857	-2801.683
STORY1	P09D	EQYPOS							
			Top	1683.77	-29.60	-24.99	323.073	2475.916	5601.002
			Bottom	1683.77	-29.60	-24.99	323.073	-522.422	2048.779
STORY1	P10A	EQYPOS							
			Top	36.70	-163.86	11.41	1938.033	-336.279	6758.364
			Bottom	82.20	-168.46	5.53	268.644	351.744	22512.549
STORY1	P10B	EQYPOS							
			Top	44.36	162.13	11.34	-1055.264	-223.676	-4963.516
			Bottom	25.59	162.47	3.15	-871.466	248.655	-4723.516
STORY1	P10C	EQYPOS							
			Top	72.04	103.53	12.12	397.304	-503.930	-5151.072
			Bottom	128.96	103.63	9.15	-180.068	656.664	-1010.997
P1	P01A	EQYPOS							
			Top	-30.78	3133.18	-1.47	-1965.555	136.412	48904.142
			Bottom	-30.78	3133.18	-1.47	-1965.555	-40.143	424895.810
P1	P02	EQYPOS							
			Top	12.14	272.25	-0.52	57.688	41.911	112854.024
			Bottom	12.14	272.25	-0.52	57.688	-20.655	145523.937

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
P1	P03	EQYPOS							
			Top	-1010.09	-79.87	-0.20	94.883	23.085	84846.550
			Bottom	-1010.09	-79.87	-0.20	94.883	-0.422	75262.635
P1	P04	EQYPOS							
			Top	-535.64	-133.01	-39.79	5516.642	475.919	93338.110
			Bottom	-514.63	-131.50	5.14	-565.917	260.407	80397.950
P1	P05	EQYPOS							
			Top	-39.02	-261.63	-0.27	337.553	24.302	257104.990
			Bottom	-39.02	-261.63	-0.27	337.553	-8.089	225709.560
P1	P06A	EQYPOS							
			Top	-218.02	528.82	2.58	382.501	-149.773	-21199.036
			Bottom	-218.02	528.82	2.58	382.501	160.185	42259.235
P1	P06B	EQYPOS							
			Top	362.55	2960.95	-2.68	2167.221	170.835	-36557.225
			Bottom	362.55	2960.95	-2.68	2167.221	-150.462	318757.201
P1	P07A	EQYPOS							
			Top	-482.39	-582.06	6.76	3393.817	133.252	88449.107
			Bottom	-482.39	-582.06	6.76	3393.817	943.919	18601.969
P1	P08A	EQYPOS							
			Top	-1571.19	30.34	3.63	75.320	112.530	-7964.932
			Bottom	-1571.19	30.34	3.63	75.320	548.189	-4324.166
P1	P08B	EQYPOS							
			Top	-97.95	68.08	9.42	164.169	-258.290	-21652.514
			Bottom	-97.95	68.08	9.42	164.169	872.083	-13493.363
P1	P08C	EQYPOS							
			Top	-155.71	-4.79	7.40	153.025	-345.441	162.943
			Bottom	-155.71	-4.79	7.40	153.025	542.814	-413.184
P1	P08D	EQYPOS							
			Top	-1573.87	-20.47	3.79	196.234	-114.104	2287.973
			Bottom	-1573.87	-20.47	3.79	196.234	340.590	-169.181
P1	P09A	EQYPOS							
			Top	1559.84	20.80	4.20	68.670	71.488	-2598.403
			Bottom	1559.84	20.80	4.20	68.670	574.894	-102.699
P1	P09B	EQYPOS							
			Top	1103.73	39.29	5.10	-35.022	72.634	-6833.216
			Bottom	1103.73	39.29	5.10	-35.022	684.218	-2119.707
P1	P09C	EQYPOS							
			Top	689.71	-58.13	1.44	-103.135	133.227	1364.951
			Bottom	668.71	-13.21	-0.07	-171.485	130.868	145.279
P1	P09D	EQYPOS							
			Top	1611.45	28.31	4.59	170.889	-181.325	-2713.119
			Bottom	1611.45	28.31	4.59	170.889	369.127	684.208
P1	P10A	EQYPOS							
			Top	165.39	-51.97	0.74	195.879	69.690	63269.418
			Bottom	165.39	-51.97	0.74	195.879	158.393	57032.628
P1	P10B	EQYPOS							
			Top	61.90	211.91	3.38	-166.732	-72.167	-44085.239
			Bottom	61.90	211.91	3.38	-166.732	333.467	-18656.313
P1	P10C	EQYPOS							
			Top	232.39	274.50	4.01	591.463	96.121	-24306.527
			Bottom	232.39	274.50	4.01	591.463	577.428	8633.530
P2	P01A	EQYPOS							
			Top	-77.21	2461.71	0.01	-1206.655	-7.264	301875.151
			Bottom	-77.21	2461.71	0.01	-1206.655	-5.612	597280.411

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
P2	P02	EQYPOS							
			Top	17.68	466.25	-0.10	2.985	14.686	113215.041
			Bottom	17.68	466.25	-0.10	2.985	2.934	169165.074
P2	P03	EQYPOS							
			Top	-1027.75	255.50	0.15	-7.321	-9.372	71746.829
			Bottom	-1027.75	255.50	0.15	-7.321	9.178	102407.324
P2	P04	EQYPOS							
			Top	-489.14	219.14	-42.40	5724.439	550.715	81166.514
			Bottom	-513.14	243.24	1.97	-363.814	34.524	107037.017
P2	P05	EQYPOS							
			Top	-20.90	318.28	-0.08	22.537	11.771	227894.269
			Bottom	-20.90	318.28	-0.08	22.537	2.736	266088.154
P2	P06A	EQYPOS							
			Top	91.87	3016.11	-0.14	406.519	24.416	429746.613
			Bottom	91.87	3016.11	-0.14	406.519	7.569	791679.844
P2	P07A	EQYPOS							
			Top	-225.28	-41.03	-0.26	24.509	30.982	-73569.201
			Bottom	-225.28	-41.03	-0.26	24.509	0.000	-78492.233
P2	P07K	EQYPOS							
			Top	-12.07	-16.99	-0.08	2.100	9.423	1043.178
			Bottom	-12.07	-16.99	-0.08	2.100	0.000	-996.046
P2	P07L	EQYPOS							
			Top	-4.11	-3.54	-0.06	0.276	7.633	200.949
			Bottom	-4.11	-3.54	-0.06	0.276	0.000	-223.615
P2	P07N	EQYPOS							
			Top	-15.92	-8.95	-0.11	-1.700	13.469	197.090
			Bottom	-15.92	-8.95	-0.11	-1.700	9.877	-89.202
P2	P07P	EQYPOS							
			Top	-11.26	-6.49	-0.06	-1.284	4.875	193.917
			Bottom	-11.26	-6.49	-0.06	-1.284	0.000	-376.948
P2	P07Q	EQYPOS							
			Top	-2.33	-1.54	-0.03	0.128	2.610	66.162
			Bottom	-2.33	-1.54	-0.03	0.128	0.000	-69.595
P2	P07R	EQYPOS							
			Top	-2.33	-0.92	-0.03	0.010	2.393	36.384
			Bottom	-2.33	-0.92	-0.03	0.010	0.000	-44.298
P2	P07S	EQYPOS							
			Top	-285.95	-102.15	-0.86	-73.446	102.943	81408.106
			Bottom	-285.95	-102.15	-0.86	-73.446	0.000	69149.578
P2	P08A	EQYPOS							
			Top	-1665.33	1.54	3.58	51.646	-24.933	-3438.792
			Bottom	-1665.33	1.54	3.58	51.646	404.516	-3253.632
P2	P08B	EQYPOS							
			Top	-102.67	11.28	-3.58	3.906	429.186	-13124.518
			Bottom	-102.67	11.28	-3.58	3.906	0.000	-11770.731
P2	P08C	EQYPOS							
			Top	-163.50	-2.77	-0.58	48.367	69.876	43.329
			Bottom	-163.50	-2.77	-0.58	48.367	0.000	-289.417
P2	P08D	EQYPOS							
			Top	-1575.50	-0.75	0.34	-181.198	183.895	-369.825
			Bottom	-1575.50	-0.75	0.34	-181.198	224.548	-460.370
P2	P09A	EQYPOS							
			Top	1648.47	1.86	2.28	37.445	23.290	-892.584
			Bottom	1648.47	1.86	2.28	37.445	296.471	-669.830

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
P2	P09B	EQYPOS							
			Top	1126.02	4.84	-0.67	183.940	326.508	-3463.18
			Bottom	1126.02	4.84	-0.67	183.940	246.460	-2882.57
P2	P09C	EQYPOS							
			Top	650.65	-35.36	24.65	1483.806	-37.351	1375.703
			Bottom	674.65	9.02	0.55	108.030	107.261	337.432
P2	P09D	EQYPOS							
			Top	1594.96	2.43	-0.78	-106.829	231.009	-331.403
			Bottom	1594.96	2.43	-0.78	-106.829	137.522	-39.929
P2	P10A	EQYPOS							
			Top	223.07	-27.52	1.09	379.040	-31.857	99928.307
			Bottom	223.07	-27.52	1.09	379.040	99.109	96626.064
P2	P10B	EQYPOS							
			Top	141.05	84.75	0.86	-479.646	9.596	-84170.120
			Bottom	141.05	84.75	0.86	-479.646	113.339	-74000.095
P2	P10C	EQYPOS							
			Top	359.81	93.03	-0.58	-133.875	95.006	-16139.925
			Bottom	359.81	93.03	-0.58	-133.875	24.846	-4976.915

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
ROOF	P02	EQYNEG							
			Top	-2.40	693.17	-0.11	-5.580	8.888	-44897.199
			Bottom	-2.40	693.17	-0.11	-5.580	-7.749	63237.961
ROOF	P03	EQYNEG							
			Top	-37.52	164.36	0.85	23.682	-79.899	-10126.669
			Bottom	-37.52	164.36	0.85	23.682	53.301	15513.786
ROOF	P04	EQYNEG							
			Top	7.91	132.99	0.67	100.776	-85.330	-6415.556
			Bottom	-17.08	134.58	0.80	76.137	61.528	11150.734
ROOF	P05	EQYNEG							
			Top	-4.51	429.94	0.59	-86.927	-54.242	-25090.357
			Bottom	-4.51	429.94	0.59	-86.927	38.496	41980.891
ROOF	P08A	EQYNEG							
			Top	-118.67	-18.45	6.27	-28.451	-550.579	1156.092
			Bottom	-118.67	-18.45	6.27	-28.451	428.243	-1722.859
ROOF	P08B	EQYNEG							
			Top	-17.41	-17.46	14.50	229.869	-1385.301	1148.165
			Bottom	-17.41	-17.46	14.50	229.869	877.383	-1575.023
ROOF	P08C	EQYNEG							
			Top	-20.15	-12.84	9.52	107.154	-854.161	1255.227
			Bottom	-20.15	-12.84	9.52	107.154	631.268	-748.298
ROOF	P08D	EQYNEG							
			Top	-62.63	61.25	2.62	19.807	-236.159	-4499.519
			Bottom	-62.63	61.25	2.62	19.807	172.596	5055.799
ROOF	P09A	EQYNEG							
			Top	121.47	9.94	6.33	-83.463	-563.153	-966.444
			Bottom	121.47	9.94	6.33	-83.463	424.434	583.688
ROOF	P09B	EQYNEG							
			Top	52.85	34.60	5.54	-171.331	-512.166	-3826.053
			Bottom	52.85	34.60	5.54	-171.331	352.445	2571.566
ROOF	P09C	EQYNEG							
			Top	11.80	21.80	3.02	51.216	-183.536	-756.235
			Bottom	36.80	21.94	1.44	-32.871	94.265	1262.690
ROOF	P09D	EQYNEG							
			Top	66.95	-65.47	2.89	27.368	-264.614	4882.641
			Bottom	66.95	-65.47	2.89	27.368	186.963	-5330.900
STORY4	P02	EQYNEG							
			Top	2.48	1401.52	0.00	8.209	14.738	-63193.151
			Bottom	2.48	1401.52	0.00	8.209	14.276	155443.190
STORY4	P03	EQYNEG							
			Top	-187.67	338.88	0.77	27.333	-65.435	-10463.017
			Bottom	-187.67	338.88	0.77	27.333	54.845	42402.753
STORY4	P04	EQYNEG							
			Top	-32.28	280.15	-1.91	512.077	-28.879	-1397.483
			Bottom	-94.47	283.63	1.03	110.215	89.892	34432.516
STORY4	P05	EQYNEG							
			Top	-12.36	840.17	0.98	-332.808	-71.974	-26322.885
			Bottom	-12.36	840.17	0.98	-332.808	80.530	104742.895
STORY4	P08A	EQYNEG							
			Top	-470.08	-43.71	11.40	-24.301	-905.455	1513.834
			Bottom	-470.08	-43.71	11.40	-24.301	872.242	-5304.240
STORY4	P08B	EQYNEG							
			Top	-37.66	-40.15	14.33	215.028	-1141.602	-289.642
			Bottom	-37.66	-40.15	14.33	215.028	1094.440	-6552.456

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
STORY4	P08C	EQYNEG							
			Top	-49.79	-12.97	12.74	237.923	-1102.667	975.252
			Bottom	-49.79	-12.97	12.74	237.923	884.093	-1048.129
STORY4	P08D	EQYNEG							
			Top	-244.62	94.07	5.57	-46.431	-424.668	-7588.506
			Bottom	-244.62	94.07	5.57	-46.431	444.590	7086.684
STORY4	P09A	EQYNEG							
			Top	468.27	16.86	10.78	-75.963	-950.514	-2360.144
			Bottom	468.27	16.86	10.78	-75.963	830.504	269.679
STORY4	P09B	EQYNEG							
			Top	221.38	54.12	8.83	-80.222	-649.146	-6832.730
			Bottom	221.38	54.12	8.83	-80.222	727.682	1609.559
STORY4	P09C	EQYNEG							
			Top	81.61	42.83	6.93	207.150	-313.020	-1317.216
			Bottom	143.81	45.76	3.45	13.654	245.076	2235.233
STORY4	P09D	EQYNEG							
			Top	256.43	-103.53	5.57	-42.170	-424.895	7901.054
			Bottom	256.43	-103.53	5.57	-42.170	444.103	-8249.229
STORY3	P02	EQYNEG							
			Top	3.61	1957.74	0.30	-70.655	23.824	-62684.752
			Bottom	3.61	1957.74	0.30	-70.655	70.320	242722.164
STORY3	P03	EQYNEG							
			Top	-481.07	543.43	1.04	-29.398	-49.276	-2361.830
			Bottom	-481.07	543.43	1.04	-29.398	113.292	82413.112
STORY3	P04	EQYNEG							
			Top	-147.08	420.21	-8.19	1357.006	167.123	16497.830
			Bottom	-258.23	428.24	0.43	178.113	87.381	68287.611
STORY3	P05	EQYNEG							
			Top	-30.89	1191.54	2.13	-1090.489	-123.395	-5834.271
			Bottom	-30.89	1191.54	2.13	-1090.489	208.396	180046.462
STORY3	P08A	EQYNEG							
			Top	-1079.95	-61.14	18.04	-30.755	-1366.003	245.749
			Bottom	-1079.95	-61.14	18.04	-30.755	1447.874	-9292.602
STORY3	P08B	EQYNEG							
			Top	-56.62	-45.39	11.09	107.655	-938.604	-5383.638
			Bottom	-56.62	-45.39	11.09	107.655	790.716	-12463.761
STORY3	P08C	EQYNEG							
			Top	-81.28	-14.72	13.74	350.759	-1102.309	745.314
			Bottom	-81.28	-14.72	13.74	350.759	1040.806	-1550.927
STORY3	P08D	EQYNEG							
			Top	-540.66	162.32	6.63	-272.043	-432.228	-13268.215
			Bottom	-540.66	162.32	6.63	-272.043	602.091	12054.196
STORY3	P09A	EQYNEG							
			Top	1077.01	6.94	16.51	-62.126	-1259.138	-5045.796
			Bottom	1077.01	6.94	16.51	-62.126	1317.090	-3963.784
STORY3	P09B	EQYNEG							
			Top	532.55	55.77	7.55	45.783	-515.490	-15897.018
			Bottom	532.55	55.77	7.55	45.783	661.818	-7197.252
STORY3	P09C	EQYNEG							
			Top	228.34	75.58	11.99	567.040	-343.996	-2424.318
			Bottom	339.49	84.21	3.95	123.056	273.145	4228.642
STORY3	P09D	EQYNEG							
			Top	570.76	-176.73	6.54	-268.818	-426.250	13322.260
			Bottom	570.76	-176.73	6.54	-268.818	593.630	-14247.000

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
STORY2	P02	EQYNEG							
			Top	42.52	2184.13	0.91	-151.962	56.912	-31831.145
			Bottom	42.52	2184.13	0.91	-151.962	221.315	361310.883
STORY2	P03	EQYNEG							
			Top	-937.61	845.71	1.19	-62.502	-5.014	16708.668
			Bottom	-937.61	845.71	1.19	-62.502	208.293	168936.035
STORY2	P04	EQYNEG							
			Top	-366.57	651.10	-4.99	816.382	243.355	43785.196
			Bottom	-502.10	649.39	2.49	-181.151	338.633	143153.726
STORY2	P05	EQYNEG							
			Top	-40.93	1290.45	1.81	-666.156	-34.246	41743.473
			Bottom	-40.93	1290.45	1.81	-666.156	291.689	274024.919
STORY2	P08A	EQYNEG							
			Top	-1870.77	-24.86	31.35	-56.457	-1717.418	-2145.657
			Bottom	-1870.77	-24.86	31.35	-56.457	3925.030	-6620.994
STORY2	P08B	EQYNEG							
			Top	-73.80	-1.45	30.18	-53.433	-1164.235	-11459.484
			Bottom	-73.80	-1.45	30.18	-53.433	4267.398	-11721.196
STORY2	P08C	EQYNEG							
			Top	-110.90	-7.10	14.28	142.957	-860.950	87.239
			Bottom	-110.90	-7.10	14.28	142.957	1709.755	-1190.017
STORY2	P08D	EQYNEG							
			Top	-919.84	117.73	10.86	-160.865	-506.764	-13943.838
			Bottom	-919.84	117.73	10.86	-160.865	1447.536	7246.936
STORY2	P09A	EQYNEG							
			Top	1828.96	-18.90	30.02	-81.550	-1592.830	-10604.066
			Bottom	1828.96	-18.90	30.02	-81.550	3809.932	-14006.781
STORY2	P09B	EQYNEG							
			Top	1006.27	19.47	28.73	-93.129	-1127.973	-34088.801
			Bottom	1006.27	19.47	28.73	-93.129	4042.978	-30584.344
STORY2	P09C	EQYNEG							
			Top	478.48	54.66	13.04	213.421	-442.599	-3458.095
			Bottom	614.01	62.14	14.75	298.570	1436.449	-350.194
STORY2	P09D	EQYNEG							
			Top	959.83	-133.12	10.65	-148.193	-491.001	12326.366
			Bottom	959.83	-133.12	10.65	-148.193	1425.497	-11635.946
STORY1	P01A	EQYNEG							
			Top	-53.16	2759.31	10.16	-4145.691	-331.748	-22356.303
			Bottom	-142.77	2760.61	4.34	-1602.579	260.502	269657.957
STORY1	P01B	EQYNEG							
			Top	39.17	1176.92	-9.48	-1970.166	300.369	-8716.342
			Bottom	162.50	1175.63	-7.58	-1559.398	-274.202	104472.702
STORY1	P02	EQYNEG							
			Top	54.92	-266.81	-3.53	221.242	316.947	219230.023
			Bottom	54.92	-266.81	-3.53	221.242	-107.030	187212.734
STORY1	P03	EQYNEG							
			Top	-1109.57	-523.05	-2.94	230.166	266.234	142165.534
			Bottom	-1109.57	-523.05	-2.94	230.166	-86.044	79419.527
STORY1	P04	EQYNEG							
			Top	-543.14	-399.18	-37.70	5009.960	569.681	130290.864
			Bottom	-514.76	-456.03	2.57	-437.380	215.486	80426.988
STORY1	P05	EQYNEG							
			Top	-28.03	-333.29	-2.27	-167.997	234.458	205936.570
			Bottom	-28.03	-333.29	-2.27	-167.997	-38.284	165941.386

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
STORY1	P06A	EQYNEG							
			Top	15.74	3692.54	5.07	5809.335	-60.907	-32216.63
			Bottom	105.76	3692.06	3.50	4759.130	126.211	350197.21
STORY1	P07A	EQYNEG							
			Top	-63.17	196.20	20.96	-2166.832	-1039.409	-13917.544
			Bottom	-63.17	196.20	20.96	-2166.832	-452.644	-8423.844
STORY1	P07B	EQYNEG							
			Top	-85.10	264.58	7.47	89.926	-161.365	-33214.603
			Bottom	-85.10	264.58	7.47	89.926	256.926	-18398.09
STORY1	P07C	EQYNEG							
			Top	-63.96	-82.72	6.07	-381.894	-166.210	25551.775
			Bottom	-63.96	-82.72	6.07	-381.894	173.467	20919.606
STORY1	P07D	EQYNEG							
			Top	-276.52	196.52	22.73	-3482.948	502.583	-51850.056
			Bottom	-276.52	196.52	22.73	-3482.948	1320.875	-44775.194
STORY1	P08A	EQYNEG							
			Top	-2272.19	19.39	-24.84	7.028	2887.727	-2965.932
			Bottom	-2272.19	19.39	-24.84	7.028	-93.532	-639.063
STORY1	P08B	EQYNEG							
			Top	-84.73	51.46	-23.38	162.541	3129.984	-11086.939
			Bottom	-84.73	51.46	-23.38	162.541	324.569	-4912.156
STORY1	P08C	EQYNEG							
			Top	-129.49	-0.92	-1.50	238.588	566.158	-185.002
			Bottom	-129.49	-0.92	-1.50	238.588	385.819	-295.920
STORY1	P08D	EQYNEG							
			Top	-1113.12	51.35	-10.05	56.432	1117.021	-6070.506
			Bottom	-1113.12	51.35	-10.05	56.432	-89.292	91.972
STORY1	P09A	EQYNEG							
			Top	2218.04	90.80	-24.68	-23.134	2949.166	-17394.301
			Bottom	2218.04	90.80	-24.68	-23.134	-11.891	-6498.472
STORY1	P09B	EQYNEG							
			Top	1188.91	155.02	-35.33	-442.439	3867.045	-40833.959
			Bottom	1188.91	155.02	-35.33	-442.439	-372.226	-22231.693
STORY1	P09C	EQYNEG							
			Top	673.33	-30.51	-67.82	-3302.758	2132.802	-3533.553
			Bottom	644.95	9.76	-10.97	-51.531	-211.744	-1406.870
STORY1	P09D	EQYNEG							
			Top	1140.18	-9.69	-9.98	76.529	1132.362	783.884
			Bottom	1140.18	-9.69	-9.98	76.529	-65.137	-378.398
STORY1	P10A	EQYNEG							
			Top	54.58	-317.26	13.82	2023.427	-378.105	12836.867
			Bottom	104.59	-323.36	6.55	345.951	416.526	20623.530
STORY1	P10B	EQYNEG							
			Top	27.19	21.15	8.81	-1198.920	-202.123	-349.265
			Bottom	17.33	21.23	2.60	-634.593	197.869	-10550.244
STORY1	P10C	EQYNEG							
			Top	69.98	-271.86	12.08	-1406.618	-503.210	6069.264
			Bottom	125.65	-271.87	9.15	-831.890	656.626	-11110.093
P1	P01A	EQYNEG							
			Top	-28.34	3690.24	-0.85	-2388.037	88.607	24418.890
			Bottom	-28.34	3690.24	-0.85	-2388.037	-13.424	467247.247
P1	P02	EQYNEG							
			Top	6.14	-33.73	-0.17	134.214	13.623	186012.499
			Bottom	6.14	-33.73	-0.17	134.214	-6.300	181965.143

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
P1	P03	EQYNEG							
			Top	-1018.84	-109.81	-0.10	110.122	12.964	89954.606
			Bottom	-1018.84	-109.81	-0.10	110.122	1.303	75777.646
P1	P04	EQYNEG							
			Top	-464.62	-83.94	-35.56	4960.132	390.955	82724.384
			Bottom	-455.43	-80.91	4.55	-470.172	231.117	74260.586
P1	P05	EQYNEG							
			Top	-23.65	68.83	0.41	-10.892	-23.451	165992.133
			Bottom	-23.65	68.83	0.41	-10.892	25.243	174151.403
P1	P06A	EQYNEG							
			Top	-195.92	434.30	2.51	304.430	-160.467	-16986.905
			Bottom	-195.92	434.30	2.51	304.430	140.479	35228.806
P1	P06B	EQYNEG							
			Top	305.00	2462.28	-1.85	1742.430	125.651	-25053.513
			Bottom	305.00	2462.28	-1.85	1742.430	-96.405	270420.050
P1	P07A	EQYNEG							
			Top	-472.00	-53.43	6.07	3440.561	159.224	-45954.798
			Bottom	-472.00	-53.43	6.07	3440.561	888.215	-52366.575
P1	P08A	EQYNEG							
			Top	-2247.72	-2.48	2.82	-6.584	101.943	-831.725
			Bottom	-2247.72	-2.48	2.82	-6.584	440.791	-1129.506
P1	P08B	EQYNEG							
			Top	-92.05	10.04	9.82	74.208	-321.896	-4460.347
			Bottom	-92.05	10.04	9.82	74.208	856.846	-3255.386
P1	P08C	EQYNEG							
			Top	-141.12	-6.21	6.60	133.070	-292.691	344.619
			Bottom	-141.12	-6.21	6.60	133.070	499.611	-401.034
P1	P08D	EQYNEG							
			Top	-1112.81	11.56	3.58	31.983	-73.178	29.925
			Bottom	-1112.81	11.56	3.58	31.983	356.868	1416.789
P1	P09A	EQYNEG							
			Top	2242.42	37.27	4.21	-8.790	-11.600	-6608.426
			Bottom	2242.42	37.27	4.21	-8.790	493.815	-2136.184
P1	P09B	EQYNEG							
			Top	1105.20	74.01	5.10	-147.279	39.662	-17344.511
			Bottom	1105.20	74.01	5.10	-147.279	651.411	-8462.839
P1	P09C	EQYNEG							
			Top	606.02	-42.71	3.25	23.511	117.763	907.554
			Bottom	596.83	-2.60	0.21	-134.416	138.401	413.251
P1	P09D	EQYNEG							
			Top	1135.51	-3.57	4.02	18.479	-107.138	-593.633
			Bottom	1135.51	-3.57	4.02	18.479	375.486	-1021.871
P1	P10A	EQYNEG							
			Top	195.37	-165.14	0.86	243.195	78.028	76169.254
			Bottom	195.37	-165.14	0.86	243.195	180.848	56352.297
P1	P10B	EQYNEG							
			Top	55.92	104.72	2.83	-124.737	-59.961	-37103.661
			Bottom	55.92	104.72	2.83	-124.737	279.741	-24537.687
P1	P10C	EQYNEG							
			Top	225.83	1.11	3.61	415.365	111.282	-1980.961
			Bottom	225.83	1.11	3.61	415.365	544.078	-1847.965
P2	P01A	EQYNEG							
			Top	-81.59	2982.76	-0.25	-1414.496	22.300	304703.003
			Bottom	-81.59	2982.76	-0.25	-1414.496	-7.729	662634.375

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
P2	P02	EQYNEG							
			Top	10.13	433.08	-0.30	-23.918	31.715	166114.728
			Bottom	10.13	433.08	-0.30	-23.918	-3.970	218084.190
P2	P03	EQYNEG							
			Top	-1032.06	259.12	0.04	-18.101	5.748	72842.040
			Bottom	-1032.06	259.12	0.04	-18.101	10.365	103936.095
P2	P04	EQYNEG							
			Top	-440.99	229.53	-38.96	5232.850	515.318	73765.724
			Bottom	-467.30	253.30	1.59	-238.872	29.283	100535.770
P2	P05	EQYNEG							
			Top	-5.81	368.94	-0.16	-95.160	19.243	161310.307
			Bottom	-5.81	368.94	-0.16	-95.160	-0.136	205582.791
P2	P06A	EQYNEG							
			Top	66.23	2461.26	-0.37	218.993	49.654	387541.619
			Bottom	66.23	2461.26	-0.37	218.993	5.204	682892.728
P2	P07A	EQYNEG							
			Top	-264.73	86.93	-0.14	7.948	17.209	-80965.154
			Bottom	-264.73	86.93	-0.14	7.948	0.000	-70533.797
P2	P07K	EQYNEG							
			Top	-16.37	12.42	-0.06	-0.531	7.725	-479.595
			Bottom	-16.37	12.42	-0.06	-0.531	0.000	1011.113
P2	P07L	EQYNEG							
			Top	-4.37	2.86	-0.05	-0.229	6.596	-163.777
			Bottom	-4.37	2.86	-0.05	-0.229	0.000	179.862
P2	P07N	EQYNEG							
			Top	-11.90	7.22	-0.08	-3.653	9.728	-677.025
			Bottom	-11.90	7.22	-0.08	-3.653	7.134	-445.844
P2	P07P	EQYNEG							
			Top	-7.83	5.10	-0.03	-1.903	2.845	-157.383
			Bottom	-7.83	5.10	-0.03	-1.903	0.000	291.213
P2	P07Q	EQYNEG							
			Top	-1.92	1.17	-0.02	-0.058	2.176	-50.013
			Bottom	-1.92	1.17	-0.02	-0.058	0.000	52.703
P2	P07R	EQYNEG							
			Top	-2.15	0.96	-0.02	-0.187	2.112	-39.857
			Bottom	-2.15	0.96	-0.02	-0.187	0.000	44.580
P2	P07S	EQYNEG							
			Top	-234.29	26.79	-0.75	-89.263	89.904	71450.152
			Bottom	-234.29	26.79	-0.75	-89.263	0.000	74664.456
P2	P08A	EQYNEG							
			Top	-2294.00	8.93	3.18	42.897	49.386	-699.285
			Bottom	-2294.00	8.93	3.18	42.897	430.847	372.741
P2	P08B	EQYNEG							
			Top	-96.60	14.51	-3.42	-4.128	410.377	-2981.663
			Bottom	-96.60	14.51	-3.42	-4.128	0.000	-1241.050
P2	P08C	EQYNEG							
			Top	-148.59	1.30	-0.46	39.428	55.295	-3.240
			Bottom	-148.59	1.30	-0.46	39.428	0.000	152.584
P2	P08D	EQYNEG							
			Top	-1157.05	15.60	0.93	-189.883	100.243	-1648.830
			Bottom	-1157.05	15.60	0.93	-189.883	211.800	222.581
P2	P09A	EQYNEG							
			Top	2284.75	4.73	1.48	24.539	118.861	-2489.418
			Bottom	2284.75	4.73	1.48	24.539	296.172	-1922.094

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
P2	P09B	EQYNEG							
			Top	1122.87	12.99	-0.48	178.220	307.945	-9461.319
			Bottom	1122.87	12.99	-0.48	178.220	250.231	-7903.071
P2	P09C	EQYNEG							
			Top	589.52	-29.25	24.58	1465.664	-60.012	1068.341
			Bottom	615.84	11.29	0.81	108.857	110.818	246.526
P2	P09D	EQYNEG							
			Top	1161.91	-7.94	0.07	-132.965	133.502	815.907
			Bottom	1161.91	-7.94	0.07	-132.965	141.813	-136.426
P2	P10A	EQYNEG							
			Top	264.30	-104.39	1.46	430.069	-60.520	113840.133
			Bottom	264.30	-104.39	1.46	430.069	114.841	101312.929
P2	P10B	EQYNEG							
			Top	120.70	9.08	0.65	-421.156	19.458	-73362.242
			Bottom	120.70	9.08	0.65	-421.156	97.591	-72273.008
P2	P10C	EQYNEG							
			Top	351.08	-104.09	-0.38	-240.725	69.989	3302.071
			Bottom	351.08	-104.09	-0.38	-240.725	24.903	-9189.313

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
ROOF	P02	EQXPOS							
			Top	-16.03	-92.99	0.53	46.745	-54.106	6010.096
			Bottom	-16.03	-92.99	0.53	46.745	28.638	-8495.601
ROOF	P03	EQXPOS							
			Top	-67.23	79.60	-0.65	24.287	53.763	-6966.862
			Bottom	-67.23	79.60	-0.65	24.287	-47.105	5451.046
ROOF	P04	EQXPOS							
			Top	5.87	48.73	-6.44	-61.943	476.688	3428.095
			Bottom	-55.20	48.65	-5.58	-172.997	-323.074	2798.692
ROOF	P05	EQXPOS							
			Top	56.78	-20.88	-4.45	-40.585	425.112	408.506
			Bottom	56.78	-20.88	-4.45	-40.585	-269.650	-2848.948
ROOF	P08A	EQXPOS							
			Top	24.97	132.17	-1.07	-129.449	95.235	-3694.535
			Bottom	24.97	132.17	-1.07	-129.449	-71.735	16923.798
ROOF	P08B	EQXPOS							
			Top	31.75	371.64	-4.73	-166.168	448.128	-10171.090
			Bottom	31.75	371.64	-4.73	-166.168	-290.262	47805.521
ROOF	P08C	EQXPOS							
			Top	-18.20	53.26	-0.53	-78.943	40.108	-5024.324
			Bottom	-18.20	53.26	-0.53	-78.943	-42.513	3283.600
ROOF	P08D	EQXPOS							
			Top	-25.66	54.85	-0.80	-23.470	73.604	-3759.380
			Bottom	-25.66	54.85	-0.80	-23.470	-50.874	4797.878
ROOF	P09A	EQXPOS							
			Top	-7.16	128.70	-0.71	60.684	60.460	-3524.875
			Bottom	-7.16	128.70	-0.71	60.684	-49.630	16551.587
ROOF	P09B	EQXPOS							
			Top	89.76	417.76	0.41	1.733	-39.540	-14696.741
			Bottom	89.76	417.76	0.41	1.733	24.746	50473.654
ROOF	P09C	EQXPOS							
			Top	-46.68	76.74	-0.27	20.193	38.158	-4228.741
			Bottom	14.39	77.60	-0.19	19.816	-17.696	4466.344
ROOF	P09D	EQXPOS							
			Top	-28.09	58.64	0.34	17.170	-32.230	-4023.095
			Bottom	-28.09	58.64	0.34	17.170	20.336	5124.375
STORY4	P02	EQXPOS							
			Top	-64.36	-186.01	-7.28	166.017	175.231	8410.775
			Bottom	-64.36	-186.01	-7.28	166.017	-959.720	-20607.486
STORY4	P03	EQXPOS							
			Top	-210.04	110.41	-6.18	224.071	245.673	-11413.381
			Bottom	-210.04	110.41	-6.18	224.071	-718.771	5810.197
STORY4	P04	EQXPOS							
			Top	-102.81	99.01	-13.63	416.089	568.452	80.954
			Bottom	-206.97	100.21	-10.30	-27.652	-887.252	1668.576
STORY4	P05	EQXPOS							
			Top	316.91	-12.09	-9.52	49.808	461.220	-1074.524
			Bottom	316.91	-12.09	-9.52	49.808	-1023.148	-2960.490
STORY4	P08A	EQXPOS							
			Top	96.12	358.94	-1.57	-142.618	130.591	12647.126
			Bottom	96.12	358.94	-1.57	-142.618	-113.910	68641.345
STORY4	P08B	EQXPOS							
			Top	67.10	753.13	-3.78	-135.074	332.687	36813.681
			Bottom	67.10	753.13	-3.78	-135.074	-257.243	154302.529

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
STORY4	P08C	EQXPOS	Top	-35.10	68.88	-1.42	-124.178	119.459	-2354.108
			Bottom	-35.10	68.88	-1.42	-124.178	-102.188	8391.609
STORY4	P08D	EQXPOS	Top	-149.26	152.48	-0.44	-48.695	47.353	-5867.608
			Bottom	-149.26	152.48	-0.44	-48.695	-21.546	17919.618
STORY4	P09A	EQXPOS	Top	-29.38	354.65	-1.29	95.370	105.811	13072.478
			Bottom	-29.38	354.65	-1.29	95.370	-96.195	68397.410
STORY4	P09B	EQXPOS	Top	258.20	813.36	0.57	60.514	-53.813	30571.348
			Bottom	258.20	813.36	0.57	60.514	35.809	157456.172
STORY4	P09C	EQXPOS	Top	14.59	120.88	1.34	110.781	-13.813	-3100.668
			Bottom	118.74	124.21	0.14	36.262	-7.625	10490.138
STORY4	P09D	EQXPOS	Top	-161.74	156.20	0.33	41.748	-34.049	-6318.834
			Bottom	-161.74	156.20	0.33	41.748	17.776	18047.603
STORY3	P02	EQXPOS	Top	-145.61	-268.75	-6.47	516.611	-472.296	8333.815
			Bottom	-145.61	-268.75	-6.47	516.611	-1482.060	-33591.846
STORY3	P03	EQXPOS	Top	-424.34	128.36	-8.42	998.529	-48.113	-20748.481
			Bottom	-424.34	128.36	-8.42	998.529	-1361.228	-724.473
STORY3	P04	EQXPOS	Top	-290.85	153.73	-18.95	1513.467	126.479	-5804.306
			Bottom	-421.09	157.11	-8.31	122.329	-1201.155	1140.513
STORY3	P05	EQXPOS	Top	804.18	-1.31	-9.00	292.194	-183.335	-2482.209
			Bottom	804.18	-1.31	-9.00	292.194	-1586.595	-2686.882
STORY3	P08A	EQXPOS	Top	218.22	541.90	-2.60	-82.214	183.963	64342.503
			Bottom	218.22	541.90	-2.60	-82.214	-222.065	148879.167
STORY3	P08B	EQXPOS	Top	99.21	1156.37	-4.87	-64.360	377.065	144153.535
			Bottom	99.21	1156.37	-4.87	-64.360	-383.129	324547.707
STORY3	P08C	EQXPOS	Top	-49.85	58.22	-2.68	-182.987	204.735	3193.648
			Bottom	-49.85	58.22	-2.68	-182.987	-213.913	12276.277
STORY3	P08D	EQXPOS	Top	-390.38	195.22	0.85	-144.414	-62.905	-582.310
			Bottom	-390.38	195.22	0.85	-144.414	70.176	29871.239
STORY3	P09A	EQXPOS	Top	-69.17	539.05	-2.14	115.858	149.404	65671.654
			Bottom	-69.17	539.05	-2.14	115.858	-183.903	149763.794
STORY3	P09B	EQXPOS	Top	496.27	1235.74	1.38	143.227	-142.990	134890.788
			Bottom	496.27	1235.74	1.38	143.227	71.936	327665.476
STORY3	P09C	EQXPOS	Top	157.65	136.26	4.47	308.407	-114.229	1508.772
			Bottom	287.89	146.89	1.09	70.704	37.383	16969.068
STORY3	P09D	EQXPOS	Top	-405.31	198.41	-0.89	102.441	30.475	-616.193
			Bottom	-405.31	198.41	-0.89	102.441	-108.569	30335.942

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
STORY2	P02	EQXPOS							
			Top	-231.90	-212.91	-34.55	198.899	-324.460	-3525.331
			Bottom	-231.90	-212.91	-34.55	198.899	-6544.192	-41848.436
STORY2	P03	EQXPOS							
			Top	-619.75	51.00	-26.40	227.014	-160.389	-25111.249
			Bottom	-619.75	51.00	-26.40	227.014	-4912.703	-15931.229
STORY2	P04	EQXPOS							
			Top	-594.32	91.06	-36.92	1202.010	114.036	-18742.295
			Bottom	-819.01	92.90	-32.92	744.374	-5246.743	-32389.057
STORY2	P05	EQXPOS							
			Top	1578.51	84.17	-35.23	131.149	-306.883	1432.491
			Bottom	1578.51	84.17	-35.23	131.149	-6648.585	16583.806
STORY2	P08A	EQXPOS							
			Top	346.51	760.70	-4.38	2.629	177.215	145343.493
			Bottom	346.51	760.70	-4.38	2.629	-611.478	282269.213
STORY2	P08B	EQXPOS							
			Top	126.44	1090.86	-3.65	39.531	157.559	315993.336
			Bottom	126.44	1090.86	-3.65	39.531	-499.675	512347.790
STORY2	P08C	EQXPOS							
			Top	-61.71	163.56	-1.05	-62.802	76.191	7828.719
			Bottom	-61.71	163.56	-1.05	-62.802	-112.234	37269.833
STORY2	P08D	EQXPOS							
			Top	-765.54	360.91	1.60	-34.392	-160.783	2619.075
			Bottom	-765.54	360.91	1.60	-34.392	127.208	67583.297
STORY2	P09A	EQXPOS							
			Top	-110.20	785.87	-3.89	79.850	135.580	149011.816
			Bottom	-110.20	785.87	-3.89	79.850	-564.404	289469.240
STORY2	P09B	EQXPOS							
			Top	701.69	1166.31	-1.04	139.383	-111.571	310772.724
			Bottom	701.69	1166.31	-1.04	139.383	-299.562	520708.902
STORY2	P09C	EQXPOS							
			Top	431.49	243.10	2.23	184.117	-146.870	5417.852
			Bottom	656.18	247.10	0.40	-2.737	-40.608	37653.844
STORY2	P09D	EQXPOS							
			Top	-802.50	377.95	1.04	51.514	-50.666	1698.544
			Bottom	-802.50	377.95	1.04	51.514	135.870	69730.268
STORY1	P01A	EQXPOS							
			Top	84.65	3.25	-16.83	499.377	497.053	12168.936
			Bottom	155.59	-1.68	-16.54	327.578	-1404.405	43161.063
STORY1	P01B	EQXPOS							
			Top	47.03	269.98	-12.94	-901.224	335.592	-5687.834
			Bottom	198.66	272.00	-16.60	-1712.792	-923.483	-7484.051
STORY1	P02	EQXPOS							
			Top	-222.90	321.07	78.29	-1313.942	-7956.645	-41385.771
			Bottom	-222.90	321.07	78.29	-1313.942	1438.620	-2857.866
STORY1	P03	EQXPOS							
			Top	-666.43	113.25	61.53	-2481.232	-6161.211	-21263.474
			Bottom	-666.43	113.25	61.53	-2481.232	1222.003	-7673.020
STORY1	P04	EQXPOS							
			Top	-869.10	-84.19	99.31	-8156.179	-5919.074	-37867.161
			Bottom	-670.24	-78.48	49.31	-1321.553	476.100	-20615.303
STORY1	P05	EQXPOS							
			Top	1517.09	-125.79	70.53	-1019.655	-7522.713	16074.497
			Bottom	1517.09	-125.79	70.53	-1019.655	941.050	979.488

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
STORY1	P06A	EQXPOS							
			Top	-116.05	-533.31	-23.34	-2214.580	602.071	5243.019
			Bottom	-269.11	-535.41	-27.33	-4879.214	-1907.893	44180.803
STORY1	P07A	EQXPOS							
			Top	0.17	6141.38	-0.16	-17991.546	6.045	-118060.076
			Bottom	0.17	6141.38	-0.16	-17991.546	1.476	53898.543
STORY1	P07B	EQXPOS							
			Top	-52.48	2789.74	0.50	-1699.735	11.607	-20037.909
			Bottom	-52.48	2789.74	0.50	-1699.735	39.524	136187.260
STORY1	P07C	EQXPOS							
			Top	55.66	2783.31	-0.51	-1747.326	-12.738	-19107.140
			Bottom	55.66	2783.31	-0.51	-1747.326	-41.350	136758.128
STORY1	P07D	EQXPOS							
			Top	1.60	6133.73	-0.08	-11294.718	-6.388	-100410.643
			Bottom	1.60	6133.73	-0.08	-11294.718	-9.358	120403.767
STORY1	P08A	EQXPOS							
			Top	342.13	-1236.56	9.47	-101.925	-719.379	280309.599
			Bottom	342.13	-1236.56	9.47	-101.925	417.578	131922.316
STORY1	P08B	EQXPOS							
			Top	140.16	-1648.37	2.76	-176.049	-270.977	507804.547
			Bottom	140.16	-1648.37	2.76	-176.049	60.470	310000.479
STORY1	P08C	EQXPOS							
			Top	-69.83	-228.94	0.31	-81.038	-36.706	35089.677
			Bottom	-69.83	-228.94	0.31	-81.038	0.549	7616.681
STORY1	P08D	EQXPOS							
			Top	-735.25	-563.46	-6.31	200.586	370.045	68455.368
			Bottom	-735.25	-563.46	-6.31	200.586	-387.457	839.926
STORY1	P09A	EQXPOS							
			Top	-114.66	-1281.26	9.79	-26.585	-765.876	287058.988
			Bottom	-114.66	-1281.26	9.79	-26.585	408.877	133308.305
STORY1	P09B	EQXPOS							
			Top	759.28	-1684.24	5.65	-47.889	-470.973	511842.565
			Bottom	759.28	-1684.24	5.65	-47.889	206.630	309733.387
STORY1	P09C	EQXPOS							
			Top	687.51	-311.08	4.85	325.500	-147.057	31789.782
			Bottom	488.65	-361.08	-0.86	-84.401	-73.971	273.770
STORY1	P09D	EQXPOS							
			Top	-770.22	-591.60	-0.69	-71.784	63.074	70388.048
			Bottom	-770.22	-591.60	-0.69	-71.784	-20.312	-603.934
STORY1	P10A	EQXPOS							
			Top	1.14	1627.90	-15.41	-993.042	234.724	-29384.981
			Bottom	45.17	1632.63	-6.08	-1133.636	-288.830	99641.990
STORY1	P10B	EQXPOS							
			Top	-13.27	1608.42	16.18	-903.522	-237.276	-26502.832
			Bottom	-79.10	1610.79	5.38	-1379.021	271.244	108784.235
STORY1	P10C	EQXPOS							
			Top	-2.69	4449.95	0.10	8994.751	-7.310	-62929.707
			Bottom	-3.82	4454.57	0.07	3358.682	2.370	259885.357
P1	P01A	EQXPOS							
			Top	567.86	-7.23	8.78	286.474	-1715.143	-11698.424
			Bottom	567.86	-7.23	8.78	286.474	-661.652	-12566.490
P1	P02	EQXPOS							
			Top	-167.35	92.84	7.21	-566.967	-879.840	-19428.284
			Bottom	-167.35	92.84	7.21	-566.967	-15.118	-8287.053

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
P1	P03	EQXPOS							
			Top	-658.90	10.19	6.00	-1109.464	-701.907	-6265.225
			Bottom	-658.90	10.19	6.00	-1109.464	18.232	-5042.365
P1	P04	EQXPOS							
			Top	-478.21	-78.82	-11.19	933.355	8.711	5541.309
			Bottom	-420.42	-73.66	3.03	-965.908	-144.360	4365.184
P1	P05	EQXPOS							
			Top	822.20	-7.22	2.74	-349.632	-556.124	-5304.712
			Bottom	822.20	-7.22	2.74	-349.632	-227.861	-6171.229
P1	P06A	EQXPOS							
			Top	-244.80	-117.27	3.04	-49.053	-417.667	12624.806
			Bottom	-244.80	-117.27	3.04	-49.053	-53.235	-1447.686
P1	P06B	EQXPOS							
			Top	-290.04	110.47	3.11	2182.083	-839.556	-74959.259
			Bottom	-290.04	110.47	3.11	2182.083	-515.892	-61702.773
P1	P07A	EQXPOS							
			Top	3.40	4840.72	0.00	-765.890	-5.958	-204376.988
			Bottom	3.40	4840.72	0.00	-765.890	-5.477	376508.996
P1	P08A	EQXPOS							
			Top	266.79	-453.55	-1.12	-10.664	117.876	131001.817
			Bottom	266.79	-453.55	-1.12	-10.664	-16.580	76576.234
P1	P08B	EQXPOS							
			Top	148.47	-739.38	-1.74	-1.755	137.192	307186.664
			Bottom	148.47	-739.38	-1.74	-1.755	-71.995	218461.395
P1	P08C	EQXPOS							
			Top	-77.03	-33.63	-0.10	-20.135	3.795	6382.992
			Bottom	-77.03	-33.63	-0.10	-20.135	-7.742	2347.609
P1	P08D	EQXPOS							
			Top	-403.91	-173.64	-1.59	150.180	101.858	22772.784
			Bottom	-403.91	-173.64	-1.59	150.180	-88.518	1936.421
P1	P09A	EQXPOS							
			Top	-94.54	-449.34	-1.46	28.809	148.050	130837.716
			Bottom	-94.54	-449.34	-1.46	28.809	-27.433	76917.358
P1	P09B	EQXPOS							
			Top	757.81	-735.39	-0.96	27.015	81.628	305677.077
			Bottom	757.81	-735.39	-0.96	27.015	-33.040	217430.615
P1	P09C	EQXPOS							
			Top	287.69	-101.96	3.79	243.390	-39.205	9558.585
			Bottom	229.90	-87.74	-1.37	-70.687	-64.615	1806.627
P1	P09D	EQXPOS							
			Top	-405.89	-170.68	1.84	-45.903	-145.715	23128.001
			Bottom	-405.89	-170.68	1.84	-45.903	75.644	2646.617
P1	P10A	EQXPOS							
			Top	98.17	957.55	-4.63	-170.264	301.869	-7515.298
			Bottom	98.17	957.55	-4.63	-170.264	-253.556	107391.250
P1	P10B	EQXPOS							
			Top	-135.45	952.02	4.82	-101.451	-321.066	2065.228
			Bottom	-135.45	952.02	4.82	-101.451	256.901	116307.696
P1	P10C	EQXPOS							
			Top	-4.37	2658.01	0.06	2525.234	-7.068	-43235.604
			Bottom	-4.37	2658.01	0.06	2525.234	0.441	275725.949
P2	P01A	EQXPOS							
			Top	748.87	146.06	2.11	-134.403	-312.308	-19763.908
			Bottom	748.87	146.06	2.11	-134.403	-59.069	-2236.726

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
P2	P02	EQXPOS							
			Top	-138.36	50.71	-1.01	268.235	-348.555	-15122.884
			Bottom	-138.36	50.71	-1.01	268.235	-469.904	-9037.820
P2	P03	EQXPOS							
			Top	-619.41	0.72	-0.42	493.908	-281.128	428.362
			Bottom	-619.41	0.72	-0.42	493.908	-331.977	514.872
P2	P04	EQXPOS							
			Top	-377.42	-24.52	-36.09	5225.307	175.942	10418.119
			Bottom	-423.59	-17.29	0.26	332.905	-263.086	1983.301
P2	P05	EQXPOS							
			Top	696.66	-21.56	-0.98	257.668	-321.243	-3658.539
			Bottom	696.66	-21.56	-0.98	257.668	-439.203	-6245.889
P2	P06A	EQXPOS							
			Top	-734.99	-159.93	1.30	-924.415	-211.744	9259.969
			Bottom	-734.99	-159.93	1.30	-924.415	-55.664	-9932.110
P2	P07A	EQXPOS							
			Top	-41.56	1056.89	0.00	-130.974	-0.372	69415.216
			Bottom	-41.56	1056.89	0.00	-130.974	0.000	196241.462
P2	P07K	EQXPOS							
			Top	-45.93	256.10	-0.14	-8.803	17.031	-13569.811
			Bottom	-45.93	256.10	-0.14	-8.803	0.000	17162.029
P2	P07L	EQXPOS							
			Top	-2.96	55.60	0.00	-1.233	-0.274	-3170.628
			Bottom	-2.96	55.60	0.00	-1.233	0.000	3500.944
P2	P07N	EQXPOS							
			Top	37.14	141.50	0.10	-6.847	-12.420	-7978.762
			Bottom	37.14	141.50	0.10	-6.847	-9.108	-3450.806
P2	P07P	EQXPOS							
			Top	29.29	101.30	0.10	-0.134	-8.489	-3112.158
			Bottom	29.29	101.30	0.10	-0.134	0.000	5801.903
P2	P07Q	EQXPOS							
			Top	4.41	23.80	0.01	-0.348	-0.716	-1020.956
			Bottom	4.41	23.80	0.01	-0.348	0.000	1073.375
P2	P07R	EQXPOS							
			Top	3.45	16.40	0.00	-0.317	0.097	-666.838
			Bottom	3.45	16.40	0.00	-0.317	0.000	776.649
P2	P07S	EQXPOS							
			Top	56.47	1054.86	0.06	-135.032	-6.901	74023.854
			Bottom	56.47	1054.86	0.06	-135.032	0.000	200606.506
P2	P08A	EQXPOS							
			Top	232.80	173.41	1.06	-7.883	-102.335	76343.465
			Bottom	232.80	173.41	1.06	-7.883	24.851	97152.875
P2	P08B	EQXPOS							
			Top	153.08	163.17	0.23	-18.128	-27.228	216933.956
			Bottom	153.08	163.17	0.23	-18.128	0.000	236513.990
P2	P08C	EQXPOS							
			Top	-80.73	79.23	-0.02	-9.787	2.809	1633.636
			Bottom	-80.73	79.23	-0.02	-9.787	0.000	11141.281
P2	P08D	EQXPOS							
			Top	-333.75	99.16	-0.64	22.876	57.646	6489.231
			Bottom	-333.75	99.16	-0.64	22.876	-18.914	18388.974
P2	P09A	EQXPOS							
			Top	-89.42	167.69	1.05	-4.951	-104.359	76231.151
			Bottom	-89.42	167.69	1.05	-4.951	22.158	96354.249

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
P2	P09B	EQXPOS							
			Top	721.52	154.42	0.31	-19.275	-35.937	218001.106
			Bottom	721.52	154.42	0.31	-19.275	0.897	236531.411
P2	P09C	EQXPOS							
			Top	182.05	49.99	6.88	394.712	-93.124	3920.391
			Bottom	228.21	86.34	-0.35	-32.333	-8.106	11179.898
P2	P09D	EQXPOS							
			Top	-350.17	99.58	-0.16	-8.762	20.399	6175.554
			Bottom	-350.17	99.58	-0.16	-8.762	0.784	18124.665
P2	P10A	EQXPOS							
			Top	127.70	690.05	-0.96	-150.242	89.821	31362.880
			Bottom	127.70	690.05	-0.96	-150.242	-25.782	114169.904
P2	P10B	EQXPOS							
			Top	-152.24	689.36	0.96	-155.640	-90.228	34160.815
			Bottom	-152.24	689.36	0.96	-155.640	24.542	116884.263
P2	P10C	EQXPOS							
			Top	-4.80	1836.62	0.05	377.245	-6.253	58263.590
			Bottom	-4.80	1836.62	0.05	377.245	0.126	278657.748

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
ROOF	P02	EQXNEG							
			Top	-15.32	-215.23	0.53	71.795	-54.187	13947.319
			Bottom	-15.32	-215.23	0.53	71.795	28.973	-19629.113
ROOF	P03	EQXNEG							
			Top	-67.59	78.86	-0.68	41.825	57.111	-6980.107
			Bottom	-67.59	78.86	-0.68	41.825	-49.520	5321.795
ROOF	P04	EQXNEG							
			Top	7.02	59.96	-6.42	-26.651	469.615	2967.799
			Bottom	-57.27	59.99	-5.52	-142.740	-318.107	3671.401
ROOF	P05	EQXNEG							
			Top	55.72	87.19	-4.33	-33.385	414.078	-5944.096
			Bottom	55.72	87.19	-4.33	-33.385	-261.596	7657.624
ROOF	P08A	EQXNEG							
			Top	45.89	133.16	-2.15	-84.975	190.846	-3794.496
			Bottom	45.89	133.16	-2.15	-84.975	-145.045	16979.081
ROOF	P08B	EQXNEG							
			Top	31.17	364.53	-4.99	-106.404	471.779	-9869.649
			Bottom	31.17	364.53	-4.99	-106.404	-307.343	46996.550
ROOF	P08C	EQXNEG							
			Top	-19.18	51.08	0.09	-58.829	-15.511	-4805.141
			Bottom	-19.18	51.08	0.09	-58.829	-1.657	3162.608
ROOF	P08D	EQXNEG							
			Top	-41.71	70.08	0.00	-4.229	1.022	-4862.769
			Bottom	-41.71	70.08	0.00	-4.229	1.799	6070.451
ROOF	P09A	EQXNEG							
			Top	-28.84	126.57	-1.83	111.381	161.638	-3395.729
			Bottom	-28.84	126.57	-1.83	111.381	-124.602	16348.549
ROOF	P09B	EQXNEG							
			Top	90.90	422.61	0.18	58.210	-19.066	-15028.009
			Bottom	90.90	422.61	0.18	58.210	9.696	50899.650
ROOF	P09C	EQXNEG							
			Top	-47.16	80.24	-0.12	33.897	30.839	-4400.451
			Bottom	17.12	81.14	-0.14	27.873	-15.472	4666.784
ROOF	P09D	EQXNEG							
			Top	-11.01	42.68	1.23	38.877	-113.948	-2846.244
			Bottom	-11.01	42.68	1.23	38.877	77.759	3811.390
STORY4	P02	EQXNEG							
			Top	-63.95	-443.90	-7.24	283.599	173.895	20168.890
			Bottom	-63.95	-443.90	-7.24	283.599	-955.662	-49079.066
STORY4	P03	EQXNEG							
			Top	-211.79	114.03	-6.25	293.998	251.983	-11688.857
			Bottom	-211.79	114.03	-6.25	293.998	-723.369	6100.535
STORY4	P04	EQXNEG							
			Top	-107.04	129.73	-13.97	551.912	571.145	-198.046
			Bottom	-219.37	131.26	-10.28	59.728	-883.436	5129.948
STORY4	P05	EQXNEG							
			Top	315.04	206.59	-9.31	64.325	446.031	-7994.545
			Bottom	315.04	206.59	-9.31	64.325	-1006.775	24234.045
STORY4	P08A	EQXNEG							
			Top	180.53	356.15	-3.67	-48.487	296.846	12231.422
			Bottom	180.53	356.15	-3.67	-48.487	-275.922	67790.406
STORY4	P08B	EQXNEG							
			Top	65.82	736.18	-3.95	-9.242	347.943	36339.444
			Bottom	65.82	736.18	-3.95	-9.242	-268.129	151183.122

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
STORY4	P08C	EQXNEG							
			Top	-37.74	66.39	-0.49	-71.426	40.601	-2199.057
			Bottom	-37.74	66.39	-0.49	-71.426	-36.292	8157.199
STORY4	P08D	EQXNEG							
			Top	-212.55	176.79	1.19	-19.956	-79.374	-7819.623
			Bottom	-212.55	176.79	1.19	-19.956	105.839	19760.538
STORY4	P09A	EQXNEG							
			Top	-114.25	355.23	-3.32	193.499	265.325	13361.259
			Bottom	-114.25	355.23	-3.32	193.499	-252.297	69776.061
STORY4	P09B	EQXNEG							
			Top	261.67	825.57	0.46	184.428	-42.360	30567.493
			Bottom	261.67	825.57	0.46	184.428	28.828	159355.893
STORY4	P09C	EQXNEG							
			Top	20.82	127.37	1.94	164.141	-36.285	-3321.108
			Bottom	133.15	131.06	0.40	70.696	11.137	10970.999
STORY4	P09D	EQXNEG							
			Top	-96.69	131.04	1.96	72.145	-161.329	-4361.024
			Bottom	-96.69	131.04	1.96	72.145	145.034	16080.744
STORY3	P02	EQXNEG							
			Top	-144.92	-634.33	-6.48	768.044	-469.695	20175.171
			Bottom	-144.92	-634.33	-6.48	768.044	-1480.135	-78780.578
STORY3	P03	EQXNEG							
			Top	-425.40	118.39	-8.57	1190.080	-37.429	-20321.577
			Bottom	-425.40	118.39	-8.57	1190.080	-1373.688	-1852.064
STORY3	P04	EQXNEG							
			Top	-309.61	193.29	-19.89	1349.455	145.606	-4059.689
			Bottom	-451.76	197.34	-8.27	325.576	-1192.955	7557.303
STORY3	P05	EQXNEG							
			Top	801.20	332.61	-8.59	251.931	-213.936	-5049.277
			Bottom	801.20	332.61	-8.59	251.931	-1553.230	46837.900
STORY3	P08A	EQXNEG							
			Top	415.22	537.15	-5.74	99.869	434.045	62569.815
			Bottom	415.22	537.15	-5.74	99.869	-461.759	146365.826
STORY3	P08B	EQXNEG							
			Top	97.33	1126.53	-4.90	193.751	403.180	141357.442
			Bottom	97.33	1126.53	-4.90	193.751	-360.744	317096.475
STORY3	P08C	EQXNEG							
			Top	-54.24	56.78	-1.72	-69.792	129.862	3234.771
			Bottom	-54.24	56.78	-1.72	-69.792	-139.181	12092.556
STORY3	P08D	EQXNEG							
			Top	-535.57	242.40	2.67	-119.093	-196.482	-4311.360
			Bottom	-535.57	242.40	2.67	-119.093	219.267	33503.770
STORY3	P09A	EQXNEG							
			Top	-266.90	540.69	-4.97	301.482	378.827	66936.124
			Bottom	-266.90	540.69	-4.97	301.482	-397.049	151343.969
STORY3	P09B	EQXNEG							
			Top	499.88	1257.46	1.29	390.596	-117.826	136503.357
			Bottom	499.88	1257.46	1.29	390.596	83.445	332666.477
STORY3	P09C	EQXNEG							
			Top	179.89	145.12	5.47	439.957	-135.756	1253.434
			Bottom	322.05	156.74	1.41	163.937	61.023	17554.464
STORY3	P09D	EQXNEG							
			Top	-257.31	152.85	0.88	129.199	-100.301	3030.682
			Bottom	-257.31	152.85	0.88	129.199	37.272	26874.861

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
STORY2	P02	EQXNEG							
			Top	-240.78	-614.51	-34.49	502.470	-319.105	995.176
			Bottom	-240.78	-614.51	-34.49	502.470	-6527.305	-109717.291
STORY2	P03	EQXNEG							
			Top	-611.05	21.30	-26.70	421.127	-138.158	-24894.224
			Bottom	-611.05	21.30	-26.70	421.127	-4944.802	-21060.257
STORY2	P04	EQXNEG							
			Top	-638.81	141.80	-38.10	1529.077	158.507	-14931.575
			Bottom	-882.11	143.57	-33.19	953.091	-5271.070	-21914.575
STORY2	P05	EQXNEG							
			Top	1583.56	467.96	-35.02	317.957	-318.663	17419.360
			Bottom	1583.56	467.96	-35.02	317.957	-6623.149	101652.983
STORY2	P08A	EQXNEG							
			Top	687.93	727.93	-11.46	188.853	542.439	141600.212
			Bottom	687.93	727.93	-11.46	188.853	-1521.149	272628.309
STORY2	P08B	EQXNEG							
			Top	124.07	1041.02	-5.28	334.778	225.180	308829.406
			Bottom	124.07	1041.02	-5.28	334.778	-725.861	496212.250
STORY2	P08C	EQXNEG							
			Top	-67.64	155.36	-0.12	21.425	22.932	7894.948
			Bottom	-67.64	155.36	-0.12	21.425	1.453	35959.833
STORY2	P08D	EQXNEG							
			Top	-1008.31	370.69	5.98	28.559	-361.718	-376.421
			Bottom	-1008.31	370.69	5.98	28.559	714.690	66348.649
STORY2	P09A	EQXNEG							
			Top	-442.77	814.25	-10.72	268.885	476.315	150757.668
			Bottom	-442.77	814.25	-10.72	268.885	-1453.210	297323.460
STORY2	P09B	EQXNEG							
			Top	695.85	1208.57	-2.72	429.720	-34.901	316147.344
			Bottom	695.85	1208.57	-2.72	429.720	-524.168	533690.685
STORY2	P09C	EQXNEG							
			Top	481.17	256.81	3.16	275.133	-175.957	5039.777
			Bottom	724.47	261.73	1.39	86.782	54.213	38826.933
STORY2	P09D	EQXNEG							
			Top	-565.00	368.97	5.35	118.223	-246.503	4280.328
			Bottom	-565.00	368.97	5.35	118.223	716.362	70694.601
STORY1	P01A	EQXNEG							
			Top	92.57	-207.18	-17.69	925.781	524.250	15004.886
			Bottom	171.56	-212.44	-16.84	503.140	-1420.317	24243.392
STORY1	P01B	EQXNEG							
			Top	42.52	174.05	-11.92	-717.017	309.472	-4853.402
			Bottom	178.76	176.10	-15.57	-1525.949	-880.580	-14670.584
STORY1	P02	EQXNEG							
			Top	-233.45	639.33	78.53	-1610.692	-7954.994	-96171.677
			Bottom	-233.45	639.33	78.53	-1610.692	1468.023	-19451.688
STORY1	P03	EQXNEG							
			Top	-655.07	144.37	62.59	-2605.848	-6231.753	-25989.452
			Bottom	-655.07	144.37	62.59	-2605.848	1279.114	-8665.097
STORY1	P04	EQXNEG							
			Top	-936.00	-150.98	101.13	-8381.122	-5981.351	-28389.677
			Bottom	-720.33	-152.45	50.55	-1466.270	539.226	-17648.000
STORY1	P05	EQXNEG							
			Top	1522.24	-526.04	70.66	-1107.755	-7516.973	93889.092
			Bottom	1522.24	-526.04	70.66	-1107.755	962.342	30764.252

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P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
STORY1	P06A	EQXNEG							
			Top	-113.59	-112.31	-22.47	-1407.662	595.012	-293.256
			Bottom	-249.50	-114.39	-26.38	-4021.730	-1865.296	77615.649
STORY1	P07A	EQXNEG							
			Top	-0.11	5841.97	0.05	-15842.667	-7.717	-107708.207
			Bottom	-0.11	5841.97	0.05	-15842.667	-6.223	55867.007
STORY1	P07B	EQXNEG							
			Top	-44.74	2653.65	0.05	-1577.075	21.211	-16709.808
			Bottom	-44.74	2653.65	0.05	-1577.075	23.815	131894.713
STORY1	P07C	EQXNEG							
			Top	46.74	2644.33	0.07	-1632.420	-28.681	-15275.614
			Bottom	46.74	2644.33	0.07	-1632.420	-24.634	132806.685
STORY1	P07D	EQXNEG							
			Top	-0.43	5834.41	0.09	-9127.920	-5.351	-62022.972
			Bottom	-0.43	5834.41	0.09	-9127.920	-2.095	148015.799
STORY1	P08A	EQXNEG							
			Top	719.83	-1186.77	20.31	-110.707	-1673.691	270400.418
			Bottom	719.83	-1186.77	20.31	-110.707	763.780	127987.789
STORY1	P08B	EQXNEG							
			Top	137.52	-1583.29	4.78	-278.678	-481.558	491813.826
			Bottom	137.52	-1583.29	4.78	-278.678	92.194	301818.541
STORY1	P08C	EQXNEG							
			Top	-76.48	-219.29	-0.19	-65.952	19.888	33797.442
			Bottom	-76.48	-219.29	-0.19	-65.952	-3.201	7482.137
STORY1	P08D	EQXNEG							
			Top	-997.19	-558.40	-13.52	316.806	1002.420	65908.269
			Bottom	-997.19	-558.40	-13.52	316.806	-620.211	-1099.251
STORY1	P09A	EQXNEG							
			Top	-481.83	-1329.23	20.30	-35.530	-1718.424	295163.054
			Bottom	-481.83	-1329.23	20.30	-35.530	718.160	135655.612
STORY1	P09B	EQXNEG							
			Top	751.16	-1746.37	8.07	-130.332	-705.574	524783.710
			Bottom	751.16	-1746.37	8.07	-130.332	263.312	315219.907
STORY1	P09C	EQXNEG							
			Top	760.19	-330.37	-3.63	-99.300	53.723	32583.118
			Bottom	544.52	-380.95	-2.16	-101.873	-124.562	-383.828
STORY1	P09D	EQXNEG							
			Top	-513.66	-600.91	-7.76	44.569	695.453	72648.209
			Bottom	-513.66	-600.91	-7.76	44.569	-235.877	538.973
STORY1	P10A	EQXNEG							
			Top	-7.29	1700.67	-16.56	-1034.668	254.682	-32257.308
			Bottom	34.60	1706.12	-6.56	-1170.492	-319.465	100547.835
STORY1	P10B	EQXNEG							
			Top	-5.18	1675.31	17.38	-837.061	-247.627	-28680.848
			Bottom	-75.23	1677.80	5.64	-1491.247	295.160	111559.877
STORY1	P10C	EQXNEG							
			Top	-1.72	4627.96	0.12	9847.718	-7.603	-68248.745
			Bottom	-2.27	4632.63	0.06	3666.807	2.257	264696.813
P1	P01A	EQXNEG							
			Top	566.68	-273.85	8.48	493.003	-1692.481	9.868
			Bottom	566.68	-273.85	8.48	493.003	-674.436	-32851.983
P1	P02	EQXNEG							
			Top	-164.50	236.70	7.04	-602.573	-866.361	-53924.030
			Bottom	-164.50	236.70	7.04	-602.573	-22.038	-25520.058

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LC4

Engineers Northwest

P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
P1	P03	EQXNEG							
			Top	-654.79	24.30	5.95	-1116.401	-696.992	-8199.855
			Bottom	-654.79	24.30	5.95	-1116.401	17.280	-5283.538
P1	P04	EQXNEG							
			Top	-511.67	-101.83	-13.19	1196.955	48.951	10542.975
			Bottom	-448.34	-97.38	3.30	-1010.811	-130.667	7263.660
P1	P05	EQXNEG							
			Top	814.94	-162.46	2.41	-185.414	-533.482	37695.234
			Bottom	814.94	-162.46	2.41	-185.414	-243.707	18200.068
P1	P06A	EQXNEG							
			Top	-255.24	-72.10	3.08	-11.817	-412.861	10557.571
			Bottom	-255.24	-72.10	3.08	-11.817	-43.773	1906.130
P1	P06B	EQXNEG							
			Top	-262.80	348.60	2.72	2385.048	-867.922	-80477.125
			Bottom	-262.80	348.60	2.72	2385.048	-541.676	-38645.584
P1	P07A	EQXNEG							
			Top	-1.50	4588.12	0.33	-777.159	-18.516	-140474.484
			Bottom	-1.50	4588.12	0.33	-777.159	21.099	410099.825
P1	P08A	EQXNEG							
			Top	586.14	-438.12	-0.74	28.057	122.935	127642.971
			Bottom	586.14	-438.12	-0.74	28.057	33.978	75068.650
P1	P08B	EQXNEG							
			Top	145.67	-712.09	-1.93	40.853	166.864	299082.533
			Bottom	145.67	-712.09	-1.93	40.853	-64.555	213631.161
P1	P08C	EQXNEG							
			Top	-83.92	-32.95	0.28	-10.637	-21.218	6297.073
			Bottom	-83.92	-32.95	0.28	-10.637	12.757	2342.613
P1	P08D	EQXNEG							
			Top	-621.54	-188.69	-1.48	227.519	82.241	23836.867
			Bottom	-621.54	-188.69	-1.48	227.519	-95.910	1193.547
P1	P09A	EQXNEG							
			Top	-416.76	-457.03	-1.47	65.442	187.216	132720.973
			Bottom	-416.76	-457.03	-1.47	65.442	10.737	77877.045
P1	P09B	EQXNEG							
			Top	757.13	-751.67	-0.95	80.097	96.895	310623.668
			Bottom	757.13	-751.67	-0.95	80.097	-17.348	220423.547
P1	P09C	EQXNEG							
			Top	327.15	-109.21	2.95	184.509	-32.203	9773.761
			Bottom	263.82	-92.72	-1.50	-88.061	-68.038	1681.860
P1	P09D	EQXNEG							
			Top	-181.22	-155.65	2.12	25.855	-180.990	22127.304
			Bottom	-181.22	-155.65	2.12	25.855	72.937	3448.724
P1	P10A	EQXNEG							
			Top	83.95	1011.64	-4.69	-192.666	298.258	-13659.562
			Bottom	83.95	1011.64	-4.69	-192.666	-264.412	107737.469
P1	P10B	EQXNEG							
			Top	-132.59	1003.28	5.08	-121.356	-327.300	-1272.721
			Bottom	-132.59	1003.28	5.08	-121.356	282.656	119120.398
P1	P10C	EQXNEG							
			Top	-1.27	2788.70	0.26	2611.698	-14.406	-53872.631
			Bottom	-1.27	2788.70	0.26	2611.698	16.350	280771.892
P2	P01A	EQXNEG							
			Top	750.98	-104.69	2.24	-33.125	-326.488	-21061.625
			Bottom	750.98	-104.69	2.24	-33.125	-58.055	-33624.257

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Engineers Northwest

P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
P2	P02	EQXNEG							
			Top	-134.81	65.64	-0.92	281.480	-356.740	-40070.479
			Bottom	-134.81	65.64	-0.92	281.480	-466.593	-32193.153
P2	P03	EQXNEG							
			Top	-617.36	-1.09	-0.37	499.179	-288.326	-83.393
			Bottom	-617.36	-1.09	-0.37	499.179	-332.558	-213.923
P2	P04	EQXNEG							
			Top	-400.17	-29.34	-37.72	5458.068	192.614	13913.077
			Bottom	-445.26	-21.95	0.44	321.348	-260.640	5062.901
P2	P05	EQXNEG							
			Top	689.54	-44.77	-0.94	313.445	-324.935	27769.008
			Bottom	689.54	-44.77	-0.94	313.445	-437.789	22395.762
P2	P06A	EQXNEG							
			Top	-722.89	106.82	1.41	-832.802	-223.824	29149.191
			Bottom	-722.89	106.82	1.41	-832.802	-54.533	41967.076
P2	P07A	EQXNEG							
			Top	-22.78	995.36	-0.05	-122.988	6.334	72974.516
			Bottom	-22.78	995.36	-0.05	-122.988	0.000	192417.929
P2	P07K	EQXNEG							
			Top	-43.89	241.96	-0.15	-7.538	17.838	-12839.261
			Bottom	-43.89	241.96	-0.15	-7.538	0.000	16196.043
P2	P07L	EQXNEG							
			Top	-2.84	52.52	0.00	-0.990	0.220	-2995.352
			Bottom	-2.84	52.52	0.00	-0.990	0.000	3307.001
P2	P07N	EQXNEG							
			Top	35.24	133.73	0.09	-5.911	-10.642	-7559.643
			Bottom	35.24	133.73	0.09	-5.911	-7.804	-3280.341
P2	P07P	EQXNEG							
			Top	27.65	95.73	0.09	0.164	-7.524	-2943.513
			Bottom	27.65	95.73	0.09	0.164	0.000	5480.673
P2	P07Q	EQXNEG							
			Top	4.22	22.50	0.01	-0.259	-0.510	-965.149
			Bottom	4.22	22.50	0.01	-0.259	0.000	1014.622
P2	P07R	EQXNEG							
			Top	3.38	15.50	0.00	-0.222	0.230	-630.193
			Bottom	3.38	15.50	0.00	-0.222	0.000	733.930
P2	P07S	EQXNEG							
			Top	31.90	992.87	0.01	-127.408	-0.863	78791.445
			Bottom	31.90	992.87	0.01	-127.408	0.000	197935.417
P2	P08A	EQXNEG							
			Top	529.72	169.78	1.24	-3.684	-136.669	75049.173
			Bottom	529.72	169.78	1.24	-3.684	11.941	95422.417
P2	P08B	EQXNEG							
			Top	150.20	161.45	0.15	-14.148	-18.077	212144.097
			Bottom	150.20	161.45	0.15	-14.148	0.000	231517.564
P2	P08C	EQXNEG							
			Top	-87.78	77.27	-0.08	-5.505	9.722	1656.736
			Bottom	-87.78	77.27	-0.08	-5.505	0.000	10928.793
P2	P08D	EQXNEG							
			Top	-531.39	91.41	-0.91	26.774	96.852	7090.735
			Bottom	-531.39	91.41	-0.91	26.774	-12.629	18060.400
P2	P09A	EQXNEG							
			Top	-389.92	166.36	1.42	1.218	-148.748	76986.090
			Bottom	-389.92	166.36	1.42	1.218	21.903	96949.776

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L66

P I E R F O R C E S

STORY	PIER	LOAD	LOC	P	V2	V3	T	M2	M3
P2	P09B	EQXNEG							
			Top	723.01	150.62	0.22	-16.448	-26.852	220832.152
			Bottom	723.01	150.62	0.22	-16.448	-0.959	238906.093
P2	P09C	EQXNEG							
			Top	210.93	47.13	6.92	403.695	-82.449	4065.371
			Bottom	256.01	85.29	-0.47	-32.607	-9.746	11223.645
P2	P09D	EQXNEG							
			Top	-145.64	104.45	-0.56	3.399	66.148	5637.592
			Bottom	-145.64	104.45	-0.56	3.399	-1.021	18171.544
P2	P10A	EQXNEG							
			Top	108.05	727.01	-1.14	-174.779	103.699	24702.766
			Bottom	108.05	727.01	-1.14	-174.779	-33.353	111943.935
P2	P10B	EQXNEG							
			Top	-142.48	725.75	1.06	-183.714	-95.162	28970.697
			Bottom	-142.48	725.75	1.06	-183.714	32.120	116061.039
P2	P10C	EQXNEG							
			Top	-0.66	1931.42	-0.05	429.111	5.648	48949.743
			Bottom	-0.66	1931.42	-0.05	429.111	0.099	280719.658

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ENW ENGINEERS NORTHWEST, INC., P.S. ~ STRUCTURAL ENGINEERS

6869 WOODLAWN AVE. N. E., #205, SEATTLE, WA 98115 (206) 525-7560 FAX (206) 522-6698

PROJECT # 02110 PROJECT INS TUKWILA DATE 4/11/03

SUBJECT LATERAL SHEET 67 OF

DRAG STRUTS BY TDM

SEE PAGES
WHERE ϕV_N FOR LENGTH OF SLAB AT WALL IS LESS THAN V_U, ADD DRAG STRUTS

ROOF THRU 3RD FLOOR
ONLY PIERS P02 & P05 REQUIRE DRAG STRUTS
AT 2ND FLOOR NO DRAGS ARE REQ'D.

P02 @ ROOF
$\phi V_N = 428^k$ @ WALL
$V_U = 693^k$ $(693^k - 428^k)/(2)(12.98^{k/f}) = 10.21'$
EXTEND D.S. 30' FROM GRID © TO (B) DIAPHRAGM SHEAR OK
D.S. DESIGN LOAD $P_U = (2.8)(693 - 428) = 742^k$
@ 4TH τ_{SD}
$\phi V_N = 441^k$
$V_U = 709^k$ $(709 - 441)/(2)(12.98) = 10.32'$ OK
$P_U = (2.8)(709 - 441) = 750^k$
@ 3RD
$\phi V_N = 454^k$
$V_U = 556^k$ $(556 - 454)/(2)(12.98) = 3.9'$ OK
$P_U = (2.8)(556 - 454) = 286^k$

P05 @ ROOF
$\phi V_N = 532^k$
$V_U = 654^k$ $(654 - 532)/(2)(12.98) = 4.7'$ OK
$P_U = (2.8)(654 - 454) = 560^k$
@ 4TH
$\phi V_N = 545$
$V_U = 648$ $(648 - 545)/(2)(12.98) = 4.0'$ OK
$P_U = (2.8)(648 - 545) = 288^k$
@ 3RD
$\phi V_N = 558$
$V_U = 599$ $(599 - 558)/(2)(12.98) = 1.6'$ OK
$P_U = (2.8)(599 - 558) = 115^k$

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DOCUMENT QUALITY

ENW ENGINEERS NORTHWEST, INC., P.S. ~ STRUCTURAL ENGINEERS

6869 WOODLAWN AVE. N. E., #205, SEATTLE, WA 98115 (206) 525-7560 FAX (206) 522-6698

PROJECT # 0211O PROJECT INS - TUKWILA DATE 4/14/03

SUBJECT LATERAL SHEET L68 OF

DRAG STRUTS BY TDM

1ST FLOOR

NO DRAG LOADS @ PIER P01

PIER P02

ϕV_N = 1397k

V_U = 2451k (2451 − 1397)/(2)(39.9) = 13.2' < 30' ok

P_U = (2.8)(2451 − 1397)/2 = 1476k EA END OF WALL

PIER P03

ϕV_N = 998k

V_U = 1369k (1369-998)/(2)(39.9) = 4.6' ok

P_U = (2.8)(1369 − 998) = 1039k (ONE END ONLY)

PIER P04

ϕV_N = 1017

V_U = 1300 (1300-1017)/(2)(39.9) = 3.5' ok

P_U = (2.8)(1300-1017) = 792k

PIER P05

ϕV_N = 1716

V_U = 3290 (3290-1716)/(2)(39.9) = 19.7' ok

P_U = (2.8)(3290-1716)/2 = 2204k EA END

PIER P06A

ϕV_N = 469

V_U = 4581 (458 − 469)/(2)(39.9) = 1.4' ok

P_U = (2.8)(458 − 469) = 31k

NO DRAG LOADS @ P07

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PROJECT # 02110 PROJECT INS TUKWILA DATE 4/14/03

SUBJECT LATERAL DRAG STRUTS SHEET L69 OF

BY TDH

1ST FLOOR

PIER P08A

ϕV_N = 1277

V_U = 1998 (1998-1277)/(2)(39.9) = 9.0' OK

P_U = (2.8)(1998-1277)/2 = 1009 K EA END

PIER P08B

ϕV_N = 2274

V_U = 2739 (2739-2274)/(2)(39.9) = 5.8' OK

P_U = (2.8)(2739-2274) = 1302 K (OR 651 K EA END)

NO DRAG LOADS @ P08C

PIER P08D

ϕV_N = 539

V_U = 929 (929-539)/(2)(39.9) = 4.9' OK

P_U = (2.8)(929-539) = 1092 K

PIER P09A

ϕV_N = 1636

V_U = 2143 (2143-1636)/(2)(39.9) = 6.4' OK

P_U = (2.8)(2143-1636)/2 = 710 K EA END

PIER P09B

ϕV_N = 1855

V_U = 2955 (2955-1855)/(2)(39.9) = 13.8' OK

P_U = (2.8)(2955-1855)/2 = 1540 K EA END

PIER P09C

ϕV_N = 499

V_U = 587 (587-499)/(2)(39.9) = 1.1' OK

P_U = (2.8)(587-499) = 246 K

NO DRAG LOADS P09D OR P10

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ENW ENGINEERS NORTHWEST, INC., P.S. ~ STRUCTURAL ENGINEERS

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PROJECT # 02110 PROJECT INS TUKWILA DATE 4/14/03

SUBJECT LATERAL SHEET L20 OF

DRAG STRUT BY TDM

LEVELS P1 & P2
(PIERS P01, P06, P07 & P10 - NO DRAG LOADS)

PIER P02

@ P2 (NO DRAG REQ'D @ P1)

ϕV_N = 454k

V_U = 467k $(467k - 454k)/(2)(12.98) = 0.5'$ ok

DRAG LOAD $P_U = (2.8)(467 - 454) = 36.4k$

PIER P03

@ P1

ϕV_N = 325k

V_U = 413k $(413 - 325)/(2)(12.98) = 3.39'$ ok

DRAG LOAD $P_U = (2.8)(413 - 325) = 246k$

@ P2

ϕV_N = 325k

V_U = 369k $(369 - 325)/(2)(12.98) = 1.7'$ ok

DRAG LOAD $P_U = (2.8)(369 - 325) = 123k$

PIER P04

@ P1 ϕV_N = 331k

V_U = 408k $(408 - 331)/(2)(12.98) = 3.01$ ok

DRAG LOAD $P_U = (2.8)(408 - 331) = 216k$

@ P2

ϕV_N = 331k

V_U = 352k $(352 - 331)/(2)(12.98) = .811$ ok

DRAG LOAD $P_U = (2.8)(352 - 331) = 59k$

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DOCUMENT CONTROL

ENW ENGINEERS NORTHWEST, INC., P.S. ~ STRUCTURAL ENGINEERS

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PROJECT # 02110 PROJECT INS TUKWILA DATE 4/14/03

SUBJECT LATERAL DRAG LOADS SHEET L71 OF

BY TDY

PIER POS

@ P1

$\phi V_N = 558^k$

$V_U = 920^k$ $(920-558)/(2)(12.98) = 13.9'$ OK

DRAG LOAD $P_U = (2.8)(920-558) = 1014^k$

@ P2

$\phi V_N = 558^k$

$V_U = 580^k$ $(580-558)/(2)(12.98) = .85'$ OK

DRAG LOADS $P_U = (2.8)(580-558) = 62^k$

PIER POSA

@ P1

$\phi V_N = 415$

$V_U = 783$ $(783-415)/(2)(12.98) = 14.2'$ OK

DRAG LOAD $P_U = (2.8)(783-415) = 1030^k$

@ P2

$\phi V_N = 415$

$V_U = 627$ $(627-415)/(2)(12.98) = 8.2'$ OK

DRAG LOAD $P_U = (2.8)(627-415) = 594^k$

PIER POSB

@ P1

$\phi V_N = 740$

$V_U = 909$ $(909-740)/(2)(12.98) = 6.5'$ OK

DRAG LOAD $P_U = (2.8)(909-740) = 473^k$

@ P2

$\phi V_N = 740$ $(902-740)/(2)(12.98) = 6.2'$ OK

$V_U = 902$

$P_U = (2.8)(909-740) = 454^k$

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EXHIBIT 69

ENW ENGINEERS NORTHWEST, INC., P.S. ~ STRUCTURAL ENGINEERS

6869 WOODLAWN AVE. N. E., #205. SEATTLE. WA 98115 (206) 525-7560 FAX (206) 522-6698

PROJECT # 02110 PROJECT INSTUKWILA DATE 4/14/03

SUBJECT LATERAL DRAG LOADS SHEET L72 OF

BY TDH

PIER P08C - NO DRAG LOADS REQ'D

PIER P08D

@ P1

$\phi V_N = 175$

$V_U = 389$ $(389-175)/(2)(12.98) = 8.21'$ ok

$P_U = (2.8)(389-175) = 599^k$

@ P2

$\phi V_N = 175$

$V_U = 280$ $(280-175)/(2)(12.98) = 4.01'$ ok

$P_U = (2.8)(280-175) = 294^k$

PIER P09A

@ P1

$\phi V_N = 532$

$V_U = 872$ $(872-532)/(2)(12.98) = 13.1'$ ok

$P_U = (2.8)(872-532) = 952^k$

@ P2

$\phi V_N = 532$

$V_U = 623$ $(623-532)/(2)(12.98) = 3.5'$ ok

$P_U = (2.8)(623-532) = 255^k$

PIER P09B

@ P1

$\phi V_N = 604$

$V_U = 994$ $(994-604)/(2)(12.98) = 15.0'$ ok

$P_U = (2.8)(994-604) = 1092^k$

@ P2

$\phi V_N = 604$

$V_U = 903$ $(903-604)/(2)(12.98) = 11.5'$ ok

$P_U = (2.8)(903-604) = 837^k$

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DISCARD

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6869 WOODLAWN AVE. N. E., #205, SEATTLE, WA 98115 (206) 525-7560 FAX (206) 522-6698

PROJECT # 02110 PROJECT INS TUKWILA DATE 4/14/03

SUBJECT LATERAL DRAG STRUTS SHEET L73 OF

BY TDH

PIER P09C

@ P1

$\phi V_n = 162$

$V_u = 221$ $\quad (221-162)/(2)(12.98) = 2.3'$ OK

$P_u = (2.8)(221-162) = 165^k$

@ P2 NO DRAG REQD

PIER P09D

@ P1

$\phi V_n = 325$

$V_u = 445$ $\quad (445-325)/(2)(12.98) = 4.6'$ OK

$P_u = (2.8)(445-325) = 336^k$

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PROJECT # 02110 PROJECT INS TUKWILA DATE 4/11/03

SUBJECT LATERAL SHEET L74 OF

DRAG STRUTS BY TDA

ROOF & 4TH FLOOR @ POZ & ROOF @ POS

$P_u = 750^k$

$A_{st} = \frac{750^k}{(0.9)(60ksi)} = 13.9\,in^2 \Rightarrow$ 9 - #11, 11 - #10, 14 - #9

(ϕ)

USE 18x24 w/ 12-#10

$A_{st} = (12)(1.27) = 15.24\,in^2$ $\phi T_n = (.9)(15.24)(60) = 823^k$ OK

$\phi P_n = (.7)(.80)\left[(.85)(5ksi)(432in^2 - 15.24in^2) + (60ksi)(15.24in^2)\right]$

$\phi P_n = 1504^k > P_u$ OK

ASSUME DRAG STRUT IS FULLY BRACED, & THAT P.T TAKES ALL BENDING

TIES - SPACE AT 4" OC FOR SPLICES

$A_{sh} = .3(s h_c f'_c / f_{yh})(A_g/A_{ch} - 1)$

OR

$A_{sh} = .09(s h_c f'_c / f_{yh})$

$A_g = 432\,in^2$

$24" - 2(1.5") = 21"$

$18" - 2(1.5") = 15"$

$A_{ch} = (21)(15) = 315\,in^2$

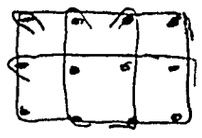
$A_{sh} = (.3)(4")(21")(5ksi/60ksi)(432/315 - 1)$

$= .78\,in^2 \Leftarrow$ CONTROLS

$.09(4")(21")(5ksi/60ksi) = .63\,in^2$

USE 4 - #4 LEGS

3 - #5 LEGS



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PROJECT # 02110 PROJECT INS TUKWILA DATE 4/3/03

SUBJECT LATERAL SHEET L75 OF

DRAG STRUTS BY TDM

3RD FLOOR @ P02 & 4TH & 3RD FLOORS @ P05

$P_U = 288^k$

$A_{ST} = \frac{288}{(.9)(60)} = 5.33 in^2 \Rightarrow$ 6 - #9, 7 - #8, 9 - #7

USE 10 - #7 $A_{ST} = (10)(.60) = 6.0 in^2$

$\phi T_N = (.9)(6.0)(60 ksi) = 324^k$ OK

USE 14 x 24 $\Rightarrow$ $336 in^2$

$\phi P_N = (.70)(.80)[(.85)(5)(336-6) + (60)(6)] = 987^k$ OK

TIES

$A_{sh} = .3(4")(21")(5/60)\left(\frac{336}{231} - 1\right) = .95 in^2$ ← CONTROLS

($\uparrow (21)(11)$)

$.09(4)(21)(5/60) = .63$ USE 4 - #5 LEGS

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PROJECT # 0210 PROJECT INS TUKWILA DATE 4/10/03

SUBJECT LATERAL SHEET L76 OF

DRAG STRUTS BY TDM

1ST FLOOR

POZ & POS

$P_U = 220^k$

$A_{ST} = \frac{220^k}{(.9)(60)} = 4.0.8 \text{ in}^2 \Rightarrow$ 10 - #18, 18 - #14, 26 - #11, 32 - #10

USE 22D x 30 W

W/ 28 - #11

$A_{ST} = (28)(1.56) = 43.68 \text{ in}^2$

$\phi T_N = (.9)(43.68)(60) = 2358^k > P_U$ OK

$\phi P_N = (.70)(.80)\left[(.85)(5)(600 - 43.68) + (60)(43.68)\right]$

$\phi P_N = 2934^k > P_U$ OK

TIES @ 4" O/C

$A_{sh} = .3(4")(26.6)(5/60)\left(\frac{600}{495} - 1\right) = .89 \text{ in}^2$ ↑ CONTROLS 5 - #4 LEGS

OR

$A_{sh} = .09(4")(26.6)(5/60) = .80 \text{ in}^2$ 3 - #5 LEGS

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PROJECT # 02110 PROJECT INS TUKWILA DATE 4/16/03

SUBJECT LATERAL DRAG STRUTS SHEET L77 OF

BY TDM

FIRST FLOOR

P03 & P04

$P_U = 1039^K$

$A_{ST} = \frac{1039}{(.9)(60)} = 19.2\ in^2 \Rightarrow$ 13 - #11, 16 - #10, 20 - #9

USE 18 x 24

W/ 16 - #10

$A_{ST} = 20.3\ in^2$

$\phi T_N = (.9)(20.3)(60) = 1096^K > P_U$ OK

$\phi P_N = (.70)(.80)[(.85)(5)(432-20.3)+(60)(20.3)]$

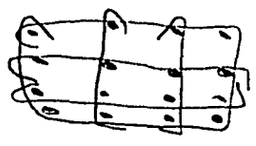
$\phi P_N = 1662^K > P_U$ OK

TIES @ 4"

$A_{sh} = .3(4")(21")(5ksi/60ksi)\left(\frac{432}{315}-1\right) = .28\ in^2$

OR

$A_{sh} = .09(4")(21")(5/60) = .63\ in^2$ ↑ USE 4 - #4 & LEGS OR 3 - #5 LEGS



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PROJECT # 02110 PROJECT INS TUKWILA DATE 4/17/03

SUBJECT LATERAL SHEET L78 OF

DRAG STRUTS BY TDM

1ST FLOOR

POS A

$P_U = 314^k$

$A_{ST} = \frac{314}{(.9)(60)} = 5.8\ in^2$ ⇒ 6-#9, 8-#8, 10-#7

USE 18x24 W/ 10-#7

$\phi T_N = (.9)(10)(.60\ in^2)(60\ ksi) = 324^k > P_U$ OK

(6 in^2)

$\phi P_N = (.70)(.80)\left[(.85)(5)(432-6)+(60)(6)\right] = 1215^k > P_U$ OK

TIES

USE 4-#4 LEGS

POS A - POS D

$P_U = 1092^k$

$A_{ST} = \frac{1092}{(.7)(60)} = 20.2\ in^2$ ⇒ 9-#14, 13-#11, 16-#10

USE 18x24 W/ 16-#10

$\phi T_N = (.9)(16)(1.27)(60) = 1097^k > P_U$ OK

($20.3\ in^2$)

$\phi P_N = (.70)(.80)\left[(.85)(5)(432-20.3)+(60)(20.3)\right] = 1662^k > P_U$ OK

TIES

USE 4-#4 LEGS

@ P09A - P09D

$P_U = 1540^k$ $A_{ST} = \frac{1540}{(.7)(60)} = 28.5\ in^2$ ⇒ 13-#14, 18-#11, 23-#10

USE 18x24 W/ 20-#11

$\phi T_N = (.9)(20)(1.56)(60) = 1684^k > P_U$ OK

($31.2\ in^2$)

$\phi P_N = (.70)(.80)\left[(.85)(5)(432-31.2)+(60)(31.2)\right] = 2002^k > P_U$ OK

TIES -

USE 4-#4 LEGS

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PROJECT # _____ PROJECT INS BLDG. DATE 3·26·03

SUBJECT DESIGN LOADS SHEET FLR1 OF _____

BY _____

FLOOR

LL = 80 psf

DL = 150 pcf $\left(\frac{8.5}{12}\right)$ + 20 psf (PARTITION) + 10 psf (MISC.) = 136.25 psf

0.25(136.25) = 102.2 > 80 psf ∴ PER UBC 97 1913.7.6.2 SKIP SPAN LOADING NEED NOT BE CHECKED.

DESIGN LL = 80 psf

DESIGN DL = SLAB WT. + 30 psf

ROOF

LL = 25 psf + MECH. LOADS.

DL = SLAB WT. + 30 psf

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DCD 12-5-03

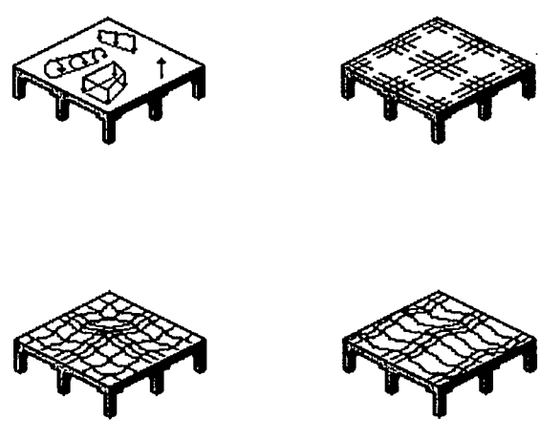
FURZ

Engineers Northwest

Floor Analysis and Design of Concrete Slabs

Dept. of Homeland Security

Parking Level Floors P1 & P2



Engineers Northwest, Inc. P.S.
6869 Woodlawn Ave. N.E.
Seattle, WA 98115
206-525-7560 Fax 206-522-6698

P1P2.floor
Project Number
Monday April 28, 2003

Floor © 1993-2001 Bommer Coleman, Inc.
v1.04C

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DELIVERED

FLR3

Report Contents

Report Cover
Report Contents
Loadings and Load Cases
Element Mesh Plan
Banded Tendon Plan
Distributed Tendon Plan
Other Dead Ldg Plan
Live Ldg Plan
Transfer Max Top Stress Plan
Transfer LC: Design Section Summary
Transfer LC: Design Section Stresses
Service LC: Design Section Summary
Service LC: Design Section Stresses
Factored LC: Design Section Summary
Factored LC: Design Section Stresses

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