FINAL REPORT

PEDESTRIAN WIND STUDY

CENTURY CITY ENTERTAINMENT CENTER REDEVELOPMENT

LOS ANGELES, CALIFORNIA

Project Number: 01-400

Date: July 17, 2001

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1. INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by Trammell Crow Company to conduct a Pedestrian Wind Study for the proposed Century City Entertainment Center Redevelopment in Los Angeles, California. The purpose of the study was to assess the wind environment around the proposed building in terms of pedestrian comfort and safety. This objective was achieved through wind tunnel testing of a 1:400 scale model, which are listed in Appendix A. The model included the proposed development and all relevant surrounding buildings and topography within a 1600 ft radius of the study site. The mean speed profile and turbulence of the natural wind approaching the modelled area were also simulated in RWDI's boundary layer wind tunnel.

The photographs in Figure 1 show the model of the proposed Century City Entertainment Center in the wind tunnel. The model was instrumented with 70 wind speed sensors to measure mean and gust wind speeds at a full scale height of approximately 5 ft. These measurements were recorded for 36 equally incremented wind directions starting from true north and were reduced to the form of wind speed ratios, by dividing by the reference wind speed at the top of the simulated boundary layer.

Wind statistics recorded at the Santa Monica Municipal Airport between 1973 and 1999 were analysed for the Summer (May through October) and Winter (November through April) seasons. Figure 2 graphically depicts the distributions of wind frequency and directionality for the two seasons. It is evident that winds from the southwesterly directions are predominant in both seasons. These wind statistics were combined with the wind tunnel data in order to predict the frequency of occurrence of full scale wind speeds. The full scale wind predictions were then compared with the RWDI criteria for pedestrian comfort and safety. These criteria, developed by RWDI through research and consulting practice since 1974, have been published in numerous journals and

conference proceedings[1,2,3,4,5]. They have also been widely accepted by municipal authorities, as well as by the building design and city planning community. For more than 20 years RWDI's criteria have been used in over 1000 pedestrian wind projects and adapted as part of environmental planning guidelines by several major cities such as Toronto, Montreal, Vancouver, Chicago, Hartford, San Diego, Pittsburgh, Bellevue, Jerusalem and Taipei.

2. PRINCIPAL RESULTS

The results of the tests are discussed in detail in Section 4 of this report and may be summarized as follows:

- Immediately around the proposed building, the wind climate was predicted to be acceptable for most of the test locations and the wind safety criterion was satisfied at all tested locations.

- Wind conditions comfortable for walking or standing were found at the north and south terraces, the plaza, as well as in the central passage of the proposed development. If more passive pedestrian activities are anticipated, wind control features should be considered.

- Several locations around the existing Twin Towers were found to have uncomfortable and/or unsafe wind conditions. These conditions were caused by the existing building configuration, and are not negatively affected by the proposed redevelopment.

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[1]Williams, C.J., Hunter, M.A. and Waechter, W.F. (1990). "Criteria for Assessing the Pedestrian Wind Environment," *Journal of Wind Engineering and Industrial Aerodynamics,* Vol.36, pp.811-815.

[2]Williams, C.J., Soligo M.J. and Cote, J. (1992). " A Discussion of the Components for a Comprehensive Pedestrian Level Comfort Criteria," *Journal of Wind Engineering and Industrial Aerodynamics,* Vol.41-44, pp.2389-2390.

[3]Soligo, M.J., Irwin, P.A., and Williams, C.J. (1993). "Pedestrian Comfort Including Wind and Thermal Effects," *Third Asia-Pacific Symposium on Wind Engineering*, Hong Kong.

[4]Soligo, M.J., Irwin, P.A., Williams, C.J. and Schuyler, G.D. (1998). "A Comprehensive Assessment of Pedestrian Comfort Including Thermal Effects," *Journal of Wind Engineering and Industrial Aerodynamics,* Vol.77&78, pp.753-766.

[5]Williams, C.J., Wu, H., Waechter, W.F. and Baker, H.A. (1999). "Experiences With Remedial Solutions to Control Pedestrian Wind Problems," *Tenth Int. Conf. on Wind Engineering, Copenhagen,* Denmark.

3. EXPLANATION OF CRITERIA

The average gust wind speeds predicted to occur at each test location on the model were compared to pedestrian comfort criteria to determine the acceptability of the wind conditions for pedestrian use. The following table is an example of how these predicted full scale wind speeds are presented in this report.

Example Table: Pedestrian Wind Comfort and Safety Categories

COMFORT CATEGORY			Sitting	Standing	Walking	Uncomfortable		**SAFETY CATEGORY**
Gust Wind Speed (mph)			0 - 11	0 - 16	0 - 20	>20		≥55
Category Limit			≥80%	≥80%	≥80%	>20%		> 3 Events Annually (0.1% of the Time)
Loc.	Config.	Season	%	%	%	%	RATING	RATING
1		84	97	99	1		Sitting	PASS
2		51	69	82	18		Walking	PASS
3		46	66	79	21		Uncomfortable	FAIL

Across the top of the table there are four comfort categories:

- **Sitting:** Gust speeds up to 11 mph - Low wind speed areas where one could read a newspaper without having it blown away. Suitable for use as outdoor cafes and other sitting areas.

- **Standing:** Gust speeds up to 16 mph - Slightly higher wind speeds that would be strong enough to rustle leaves. These wind speeds are typically comfortable at building entrances, bus stops or other areas where people may want to linger but not necessarily sit for extended periods of time.

- **Walking:** Gust speeds up to 20 mph - Winds that would lift leaves, cause movement to litter, hair and loose clothing. Appropriate for sidewalks, plazas, parks or playing fields where people are more likely to be active and receptive to some wind activity.

- **Uncomfortable:** Gust speeds greater than 20 mph - The effects of wind speeds at this level would range from small trees swaying and wind force being felt on the body (approximately 26 mph) to whole trees being in motion and inconvenience being felt when walking (approximately 52 mph gust). Winds of this magnitude would be considered a nuisance for most activities.

Along the left side of the table, the sensor location, test configuration and season are listed. The subsequent four columns show the percentage of time that the winds will fall within the wind speed ranges for each comfort category. For example at Location 1 the wind conditions are identified as comfortable for sitting 84% of the time and suitable for standing 97% of the time.

Wind conditions are considered acceptable for sitting, standing or walking if the wind speeds are within their specified ranges at least 80% of the time. This is based on research that suggests the public can tolerate a limited number of windy days before they perceive an area as having a wind problem. Using this criterion, each location has been given a comfort designation under the heading, "COMFORT CATEGORY." This designation indicates which activities can be conducted in the area. An uncomfortable designation means that the 80% criterion was not satisfied for walking.

Wind mitigation may be needed if the comfort designation listed is not consistent with the intended use of an area. For example, in the table, Location 2 has a walking designation since winds are comfortable for walking 82% of the time. If a café were proposed for this location, a sitting designation would be desired and the example shows that it would be comfortable to sit only 51% of the time.

Safety is also considered by the criteria. Wind speeds in excess of 55 mph can adversely affect a pedestrian's balance and footing. If winds of this magnitude occur more than 3 times per year (0.1% of the time), a FAIL designation is assigned under the heading, "SAFETY CATEGORY" as shown in the example table at Location 3. Wind control measures are typically required at locations that receive the FAIL rating.

These guidelines represent average wind tolerance. Regional differences in wind climate and variations in age, health, clothing, etc. can affect people's perception of the wind climate. For example, on very hot days, higher winds can be tolerated because the cooling effect of the wind would be considered pleasant. On colder days, people's tolerance of wind would be reduced, especially if they are unprepared or without appropriate clothing.

4. TEST RESULTS

The results of the wind tunnel tests are summarized in Tables 1 and 2, located in the Tables section of this report. These tables present the wind comfort and safety results for the summer and winter seasons for the proposed building configuration. These results are graphically depicted in Figures 3 and 4 at each wind measurement location. The following is a detailed discussion of the suitability of the predicted wind conditions for the anticipated pedestrian use for each area.

Areas around the Existing Twin Towers (Locations 1 through 21)

Pedestrians using areas such as sidewalks will be active and less likely to remain in one area for prolonged periods of time. Therefore, a comfort categorization of walking is considered appropriate. Lower wind speeds conducive to standing are preferred at building entrances where pedestrians are more apt to linger.

Sensor 19 malfunctioned during the test and, as a result, wind measurements at Location 19 were not available. Among the remaining 20 measurement locations around the Twin Towers, five (Locations 5, 6 9, 11 and 13) had winds that failed the criteria used to assess safety and were uncomfortable for walking for both seasons. The wind environment at five additional locations were found to be uncomfortable for walking (Locations 3, 10, 18 and 20 for both seasons and Location 21 for the summer only). Although wind conditions at Locations 1, 7 and 15 were comfortable for walking for both seasons, they are considered not suitable for building entrances.

The prevailing southwesterly winds are intercepted by the Towers and deflected down to the grade level, resulting in wind flow acceleration at the corners of the Towers and in the area between the Twin Towers. These unfavorable wind conditions were caused by the existing Twin Towers. Since the proposed redevelopment has a building mass similar to that of the existing building on the site, it is unlikely that the proposed building would have any negative impact on the wind environment in the area.

Conversely, the wind conditions at the remaining seven locations away from the corners of the Twin Towers were found to be adequate for building entrances (Locations 4, 8, 12 and 16) and sidewalks (Locations 2, 14 and 17).

Plaza Area (Locations 22 through 28, and 47 through 53)

Wind conditions comfortable for walking are acceptable for most plaza areas. Wind conditions comfortable for sitting are desirable for areas such as an outdoor café or amphitheater, where pedestrians are likely to stay for a long period of time. Low wind speeds are also desirable around a water fountain to reduce the possible water spray.

Locations 52 and 53 were sheltered by the proposed building from the prevailing southwesterly winds, resulting in wind conditions comfortable for sitting in the summer and standing in the winter. In the winter season, these locations were comfortable for sitting for 79% and 76% of the time, respectively. These conditions are considered appropriate for outdoor seating areas.

Wind conditions comfortable for standing were also found in other locations in the plaza (Locations 24 and 26 for both seasons and Locations 22 and 23 in the summer), while the level of wind comfort was rated as walking in other locations. Winds were found to affect this area after being deflected off the facade of the Twin Towers and/or being channelled into the plaza from Constellation Boulevard. These wind conditions are not suitable for the anticipated pedestrian activity (i.e., outdoor seating) on the north terrace (Locations 47 and 48). It improved wind conditions are desired, localized wind control measures, in the form of landscaping, wind screens and/or overhead trellises, should be considered.

The suitability of wind conditions in the remaining locations in the plaza depends upon the area's planned usage. Wind control measures would be necessary in any areas where passive pedestrian activities are anticipated.

Building Entrances and Sidewalks (Locations 29 through 37, 55 through 59 and 70)

Around the main entrance to the proposed development (Locations 33, 34 and 58), wind conditions were predicted to be comfortable for standing or better for both seasons. Suitable wind conditions were also recorded in other pedestrian areas immediately around the proposed development.

Offsite Pedestrian Areas (Locations 38 through 46)

Wind conditions comfortable for standing or walking were found in the offsite pedestrian areas, including walkways south of the proposed development (Locations 38 and 39), the existing Century Plaza Hotel (Locations 40 through 44) and intersections of Avenue of the Stars and Constellation Boulevard (Locations 45 and 46). At the entrance to the Century Plaza Hotel (Location 42), wind speeds were found to be comfortable for standing for both seasons. These wind conditions satisfied the wind criteria for both comfort and safety.

Elevated Locations (Locations 60 through 69)

Ideally, sitting conditions would be desired on a terrace; however, standing conditions may be accepted as a breeze is often considered pleasant in a warm climate, such as that found in Los Angeles. On the east terrace (Locations 60 through 65), wind conditions were comfortable for standing at most locations. The exception was the south edge of the terrace where wind conditions comfortable for walking were recorded at Locations 60 for the summer and at Location 61 for both seasons. The design team may wish to consider wind mitigation in this case. Localized landscaping such as 60 - 70% solid windscreens, dense trees and overhead trellises could provide some shelter from the wind.

At the north passage (Locations 66 and 67), wind conditions were comfortable for standing for both seasons, which is considered appropriate for the area.

In the elevated central passage of the proposed building (Locations 68 and 69), the wind comfort level was rated walking in general (standing in the winter at Location 68). Wind speeds in the passage were comfortable for standing for more than 76% of the time, but comfortable for sitting for less than 51% of the time. If sitting is the anticipated pedestrian activity in the passage, then wind control measures should be investigated.

5. APPLICABILITY OF RESULTS

Detailed information on the test procedures and analysis techniques is provided in RWDI's Technical Reference Document - Wind Tunnel Studies for Buildings (RD2-2000), which is available upon request. Tabulations or plots of measured wind speed ratios versus wind directions (i.e., raw wind tunnel data) have been omitted from this report in the interests of conciseness but are also available upon request.

The results presented in this report pertain to the model of Century City Entertainment Center Redevelopment constructed using the architectural design drawings listed in Appendix A. Should there be any design changes which deviate from this list of drawings, the results presented may require modification. This can only be determined by a review of any design changes. RWDI should be informed of these changes and be specifically requested, in writing, to conduct a formal review. It is the responsibility of the design team to initiate this process.

TABLES

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

COMFORT CATEGORY		Sitting	Standing	Walking	Uncomfortable		**SAFETY CATEGORY**
Gust Wind Speed (mph)		0 - 11	0 - 16	0 - 20	>20		≥55
Category Limit		≥80%	≥80%	≥80%	>20%		> 3 Events Annually (0.1% of the Time)
Loc.	Season	%	%	%	%	RATING	RATING
1	Summer	34	63	87	13	Walking	PASS
	Winter	37	63	82	18	Walking	PASS
2	Summer	66	92	99	1	Standing	PASS
	Winter	69	91	97	3	Standing	PASS
3	Summer	31	48	63	37	Uncomfortable	PASS
	Winter	41	62	75	25	Uncomfortable	PASS
4	Summer	63	94	99	1	Standing	PASS
	Winter	70	92	97	3	Standing	PASS
5	Summer	26	41	58	42	Uncomfortable	FAIL
	Winter	30	49	67	33	Uncomfortable	FAIL
6	Summer	26	39	56	44	Uncomfortable	FAIL
	Winter	29	47	65	35	Uncomfortable	FAIL
7	Summer	40	69	91	9	Walking	PASS
	Winter	48	76	91	9	Walking	PASS
8	Summer	53	88	98	2	Standing	PASS
	Winter	62	88	96	4	Standing	PASS
9	Summer	25	39	56	44	Uncomfortable	FAIL
	Winter	32	51	69	31	Uncomfortable	FAIL
10	Summer	26	40	57	43	Uncomfortable	PASS
	Winter	33	53	70	30	Uncomfortable	PASS
11	Summer	25	39	57	43	Uncomfortable	FAIL
	Winter	30	48	67	33	Uncomfortable	FAIL
12	Summer	62	95	99	1	Standing	PASS
	Winter	65	90	96	4	Standing	PASS
13	Summer	28	46	66	34	Uncomfortable	FAIL
	Winter	34	55	72	28	Uncomfortable	FAIL
14	Summer	52	89	98	2	Standing	PASS
	Winter	59	88	96	4	Standing	PASS
15	Summer	32	56	80	20	Walking	PASS
	Winter	37	61	80	20	Walking	PASS
16	Summer	48	80	96	4	Standing	PASS
	Winter	64	87	96	4	Standing	PASS
17	Summer	33	57	80	20	Walking	PASS
	Winter	44	70	85	15	Walking	PASS
18	Summer	30	49	69	31	Uncomfortable	PASS
	Winter	40	63	79	21	Uncomfortable	PASS
19	DATA NOT AVAILABLE						

Configuration - Proposed

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

COMFORT CATEGORY		Sitting	Standing	Walking	Uncomfortable		**SAFETY CATEGORY**
Gust Wind Speed (mph)		0 - 11	0 - 16	0 - 20	>20		≥55
Category Limit		≥80%	≥80%	≥80%	>20%		> 3 Events Annually (0.1% of the Time)
Loc.	Season	%	%	%	%	RATING	RATING
20	Summer	29	48	69	31	Uncomfortable	PASS
	Winter	41	62	79	21	Uncomfortable	PASS
21	Summer	30	51	74	26	Uncomfortable	PASS
	Winter	37	62	80	20	Walking	PASS
22	Summer	48	84	97	3	Standing	PASS
	Winter	49	78	91	9	Walking	PASS
23	Summer	46	85	97	3	Standing	PASS
	Winter	47	78	91	9	Walking	PASS
24	Summer	60	93	98	2	Standing	PASS
	Winter	55	83	92	8	Standing	PASS
25	Summer	37	68	90	10	Walking	PASS
	Winter	40	68	86	14	Walking	PASS
26	Summer	56	91	98	2	Standing	PASS
	Winter	57	85	94	6	Standing	PASS
27	Summer	39	71	91	9	Walking	PASS
	Winter	42	70	87	13	Walking	PASS
28	Summer	40	73	94	6	Walking	PASS
	Winter	44	73	89	11	Walking	PASS
29	Summer	44	76	94	6	Walking	PASS
	Winter	54	80	92	8	Standing	PASS
30	Summer	42	75	93	7	Walking	PASS
	Winter	51	79	92	8	Walking	PASS
31	Summer	39	71	92	8	Walking	PASS
	Winter	48	76	90	10	Walking	PASS
32	Summer	39	66	88	12	Walking	PASS
	Winter	56	77	90	10	Walking	PASS
33	Summer	48	80	95	5	Standing	PASS
	Winter	64	86	95	5	Standing	PASS
34	Summer	50	86	98	2	Standing	PASS
	Winter	65	88	97	3	Standing	PASS
35	Summer	48	82	96	4	Standing	PASS
	Winter	63	87	96	4	Standing	PASS
36	Summer	46	79	94	6	Walking	PASS
	Winter	58	83	94	6	Standing	PASS
37	Summer	68	96	99	1	Standing	PASS
	Winter	76	95	99	1	Standing	PASS
38	Summer	75	97	100	0	Standing	PASS
	Winter	81	97	99	1	Sitting	PASS

Configuration - Proposed

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

COMFORT CATEGORY		Sitting	Standing	Walking	Uncomfortable		**SAFETY CATEGORY**
Gust Wind Speed (mph)		0 - 11	0 - 16	0 - 20	>20		≥55
Category Limit		≥80%	≥80%	≥80%	>20%		> 3 Events Annually (0.1% of the Time)
Loc.	Season	%	%	%	%	RATING	RATING
39	Summer	65	89	98	2	Standing	PASS
	Winter	68	90	97	3	Standing	PASS
40	Summer	70	97	100	0	Standing	PASS
	Winter	69	92	97	3	Standing	PASS
41	Summer	45	80	95	5	Standing	PASS
	Winter	57	83	94	6	Standing	PASS
42	Summer	72	97	100	0	Standing	PASS
	Winter	72	94	98	2	Standing	PASS
43	Summer	68	96	99	1	Standing	PASS
	Winter	69	91	96	4	Standing	PASS
44	Summer	44	80	96	4	Standing	PASS
	Winter	56	82	93	7	Standing	PASS
45	Summer	37	60	81	19	Walking	PASS
	Winter	46	70	85	15	Walking	PASS
46	Summer	33	60	84	16	Walking	PASS
	Winter	43	69	86	14	Walking	PASS
47	Summer	38	62	83	17	Walking	PASS
	Winter	47	72	87	13	Walking	PASS
48	Summer	40	68	89	11	Walking	PASS
	Winter	48	74	89	11	Walking	PASS
49	Summer	39	64	85	15	Walking	PASS
	Winter	46	72	87	13	Walking	PASS
50	Summer	38	65	87	13	Walking	PASS
	Winter	44	71	87	13	Walking	PASS
51	Summer	42	65	86	14	Walking	PASS
	Winter	50	74	88	12	Walking	PASS
52	Summer	84	99	100	0	Sitting	PASS
	Winter	79	94	97	3	Standing	PASS
53	Summer	82	99	100	0	Sitting	PASS
	Winter	76	94	97	3	Standing	PASS
54	Summer	47	80	96	4	Standing	PASS
	Winter	54	82	94	6	Standing	PASS
55	Summer	61	92	99	1	Standing	PASS
	Winter	63	88	96	4	Standing	PASS
56	Summer	42	74	92	8	Walking	PASS
	Winter	52	78	91	9	Walking	PASS
57	Summer	59	93	99	1	Standing	PASS
	Winter	67	91	97	3	Standing	PASS

Configuration - Proposed

Table 1: Pedestrian Wind Comfort and Safety Categories - Multiple Seasons

COMFORT CATEGORY		Sitting	Standing	Walking	Uncomfortable		**SAFETY CATEGORY**
Gust Wind Speed (mph)		0 - 11	0 - 16	0 - 20	>20		≥55
Category Limit		≥80%	≥80%	≥80%	>20%		> 3 Events Annually (0.1% of the Time)
Loc.	Season	%	%	%	%	RATING	RATING
58	Summer	70	97	100	0	Standing	PASS
	Winter	81	97	99	1	Sitting	PASS
59	Summer	87	99	100	0	Sitting	PASS
	Winter	88	98	100	0	Sitting	PASS
60	Summer	50	77	93	7	Walking	PASS
	Winter	57	82	93	7	Standing	PASS
61	Summer	45	70	88	12	Walking	PASS
	Winter	51	77	90	10	Walking	PASS
62	Summer	50	81	96	4	Standing	PASS
	Winter	54	81	92	8	Standing	PASS
63	Summer	61	92	99	1	Standing	PASS
	Winter	60	85	94	6	Standing	PASS
64	Summer	64	93	99	1	Standing	PASS
	Winter	69	91	97	3	Standing	PASS
65	Summer	67	96	99	1	Standing	PASS
	Winter	69	92	97	3	Standing	PASS
66	Summer	60	90	98	2	Standing	PASS
	Winter	65	88	95	5	Standing	PASS
67	Summer	55	86	97	3	Standing	PASS
	Winter	58	83	93	7	Standing	PASS
68	Summer	43	77	95	5	Walking	PASS
	Winter	51	80	93	7	Standing	PASS
69	Summer	47	76	92	8	Walking	PASS
	Winter	50	77	90	10	Walking	PASS
70	Summer	87	99	100	0	Sitting	PASS
	Winter	88	98	100	0	Sitting	PASS

Configuration - Proposed

Table 2: Number of Severe Wind Events Occurring at the Pedestrian Level

Location	Summer	Winter	Annual	Safety Category Rating
1	0.09	2.12	2.21	PASS
2	0.00	0.01	0.01	PASS
3	0.56	2.41	2.97	PASS
4	0.00	0.01	0.01	PASS
5	0.60	4.38	4.98	FAIL
6	0.73	5.50	6.23	FAIL
7	0.01	0.13	0.14	PASS
8	0.00	0.01	0.01	PASS
9	0.49	2.54	3.03	FAIL
10	0.52	2.40	2.92	PASS
11	0.42	3.23	3.65	FAIL
12	0.01	0.05	0.06	PASS
13	0.38	3.48	3.86	FAIL
14	0.00	0.05	0.05	PASS
15	0.08	1.13	1.21	PASS
16	0.00	0.01	0.01	PASS
17	0.04	0.29	0.33	PASS
18	0.10	0.58	0.68	PASS
19	DATA NOT AVAILABLE			
20	0.09	0.63	0.72	PASS
21	0.05	0.69	0.74	PASS
22	0.01	0.42	0.43	PASS
23	0.02	0.60	0.62	PASS
24	0.08	1.28	1.36	PASS
25	0.02	0.91	0.93	PASS
26	0.00	0.16	0.16	PASS
27	0.04	1.20	1.24	PASS
28	0.04	0.72	0.76	PASS
29	0.02	0.18	0.20	PASS
30	0.01	0.10	0.11	PASS
31	0.02	0.12	0.14	PASS
32	0.02	0.09	0.11	PASS
33	0.01	0.05	0.06	PASS
34	0.00	0.01	0.01	PASS
35	0.00	0.02	0.02	PASS

Configuration - Proposed

LEGEND:
PASS = 3.0 or fewer events annually
FAIL = More than 3.0 events annually
Values are for the number of wind events per season greater than or equal to a gust wind speed of 55 mph

3 events annually is approx. 0.1% of the time

Table 2: Number of Severe Wind Events Occurring at the Pedestrian Level

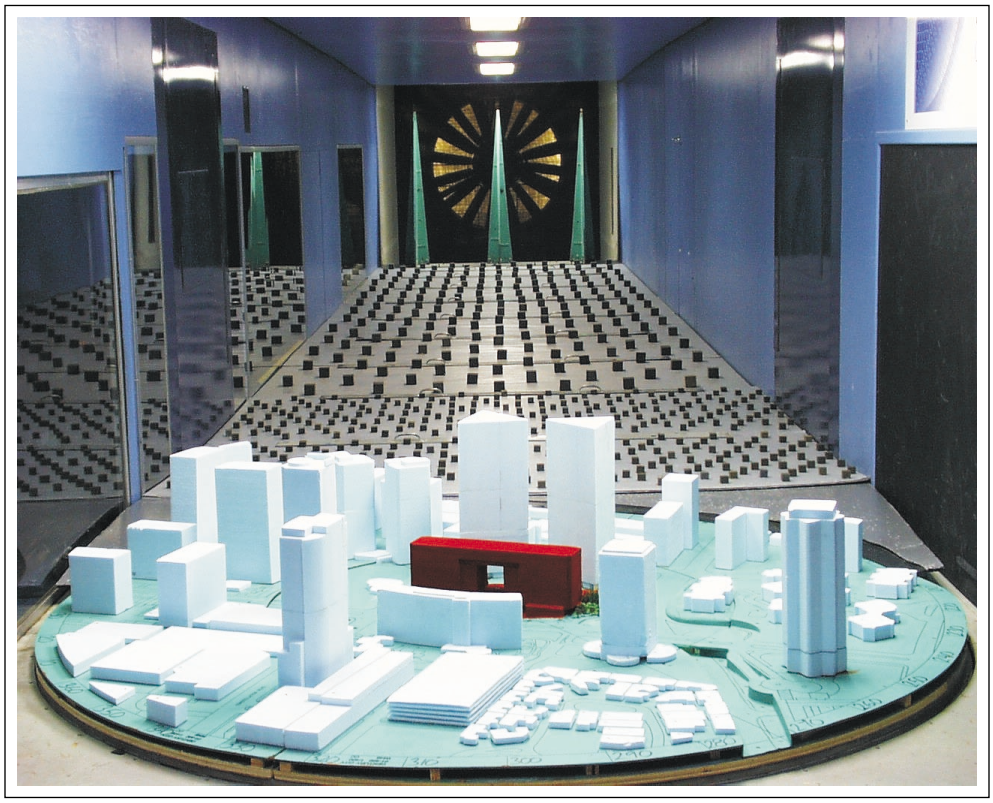
Location	Summer	Winter	Annual	Safety Category Rating
36	0.00	0.06	0.06	PASS
37	0.00	0.00	0.00	PASS
38	0.00	0.00	0.00	PASS
39	0.00	0.02	0.02	PASS
40	0.00	0.02	0.02	PASS
41	0.00	0.04	0.04	PASS
42	0.00	0.01	0.01	PASS
43	0.02	0.07	0.09	PASS
44	0.03	0.12	0.15	PASS
45	0.06	0.54	0.60	PASS
46	0.03	0.26	0.29	PASS
47	0.03	0.16	0.19	PASS
48	0.02	0.19	0.21	PASS
49	0.02	0.21	0.23	PASS
50	0.01	0.22	0.23	PASS
51	0.01	0.20	0.21	PASS
52	0.00	0.05	0.05	PASS
53	0.00	0.04	0.04	PASS
54	0.01	0.06	0.07	PASS
55	0.01	0.06	0.07	PASS
56	0.01	0.16	0.17	PASS
57	0.01	0.02	0.03	PASS
58	0.00	0.00	0.00	PASS
59	0.00	0.00	0.00	PASS
60	0.00	0.12	0.12	PASS
61	0.01	0.17	0.18	PASS
62	0.01	0.28	0.29	PASS
63	0.02	0.69	0.71	PASS
64	0.00	0.03	0.03	PASS
65	0.00	0.03	0.03	PASS
66	0.00	0.08	0.08	PASS
67	0.02	0.65	0.67	PASS
68	0.00	0.17	0.17	PASS
69	0.01	0.52	0.53	PASS
70	0.00	0.00	0.00	PASS

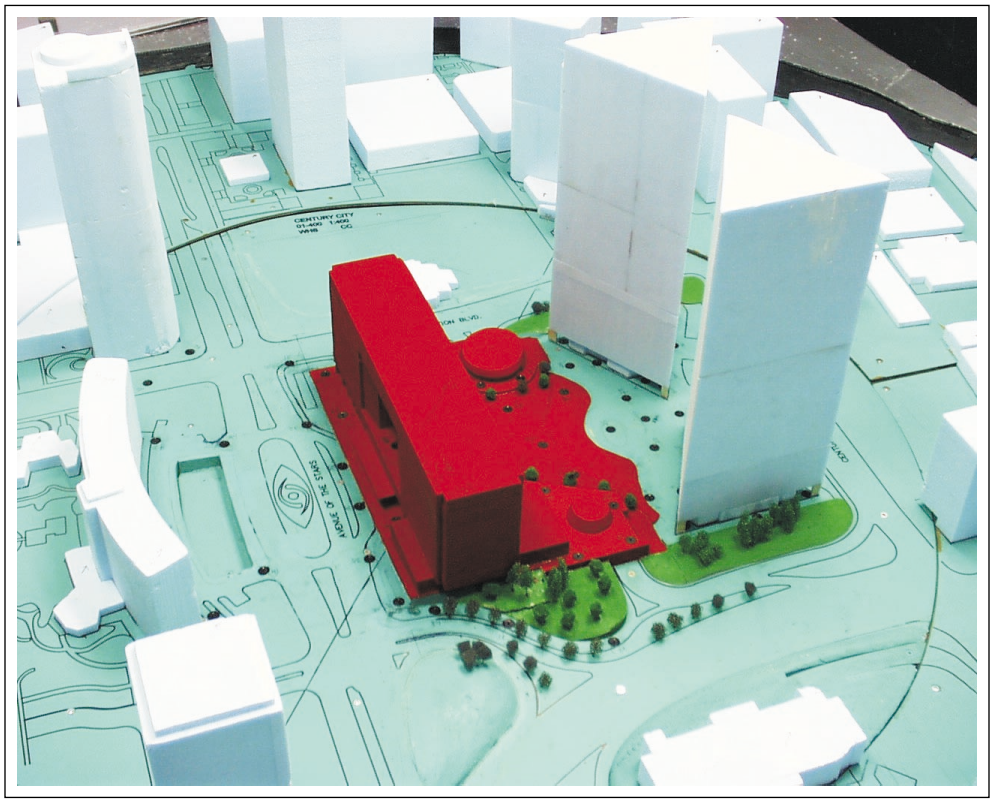
Configuration - Proposed

LEGEND:
PASS = 3.0 or fewer events annually
FAIL = More than 3.0 events annually
Values are for the number of wind events per season greater than or equal to a gust wind speed of 55 mph

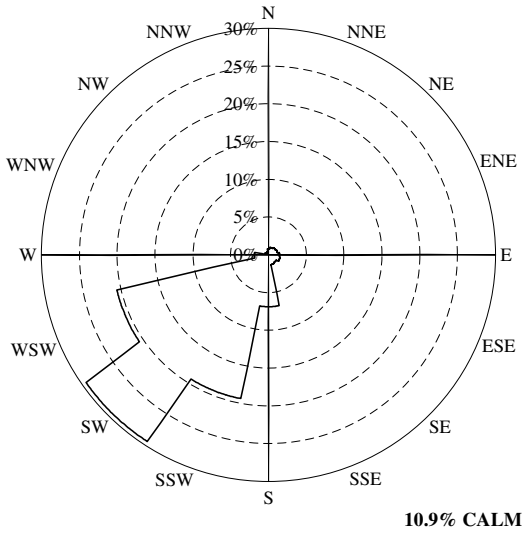
3 events annually is approx. 0.1% of the time

FIGURES

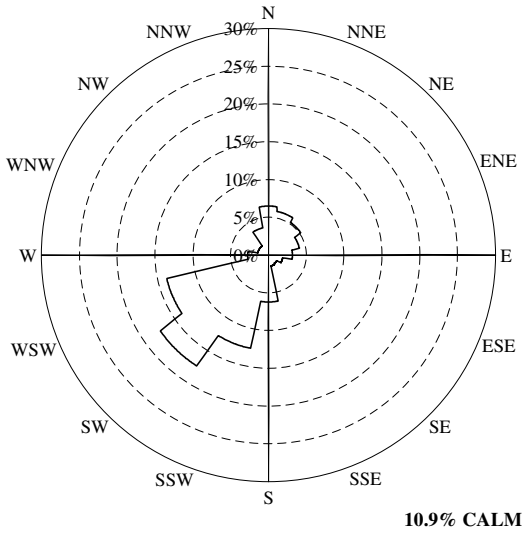




Wind Tunnel Study Model		Figure No. 1	RWDI
Century City Entertainment Center Redevelopment - LA, CA	Project #01-400	Date: July 11, 2001	

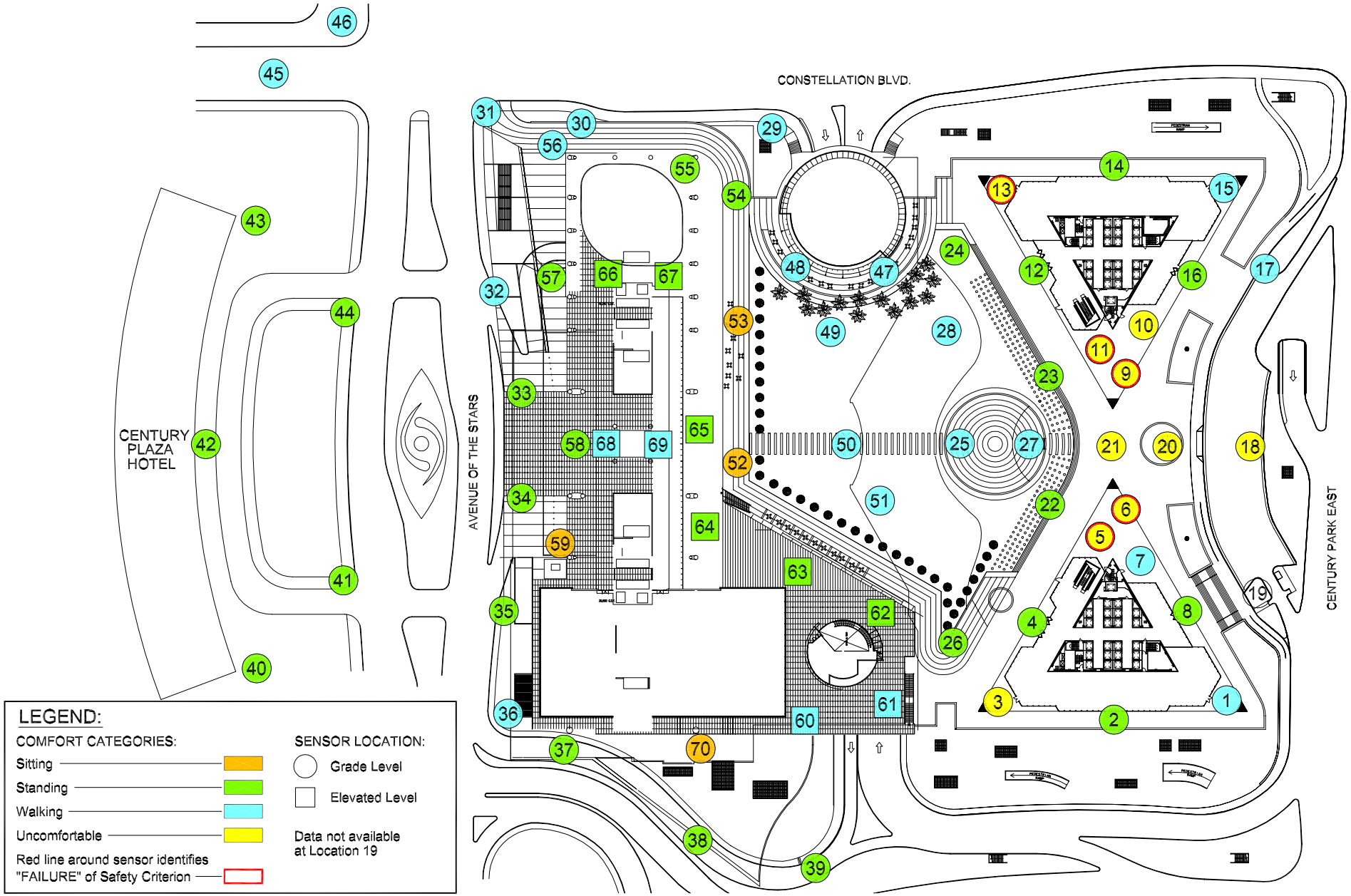


ALL SUMMER WINDS



ALL WINTER WINDS

Directional Distribution (%) of Winds (Blowing From) **Santa Monica Municipal Airport, California (1973 - 1999)** Century City Entertainment Centre Redevelopment Project #01-400	Figure No. **2** Date: July 17, 2001	RWDI



Pedestrian Wind Condition - Summer

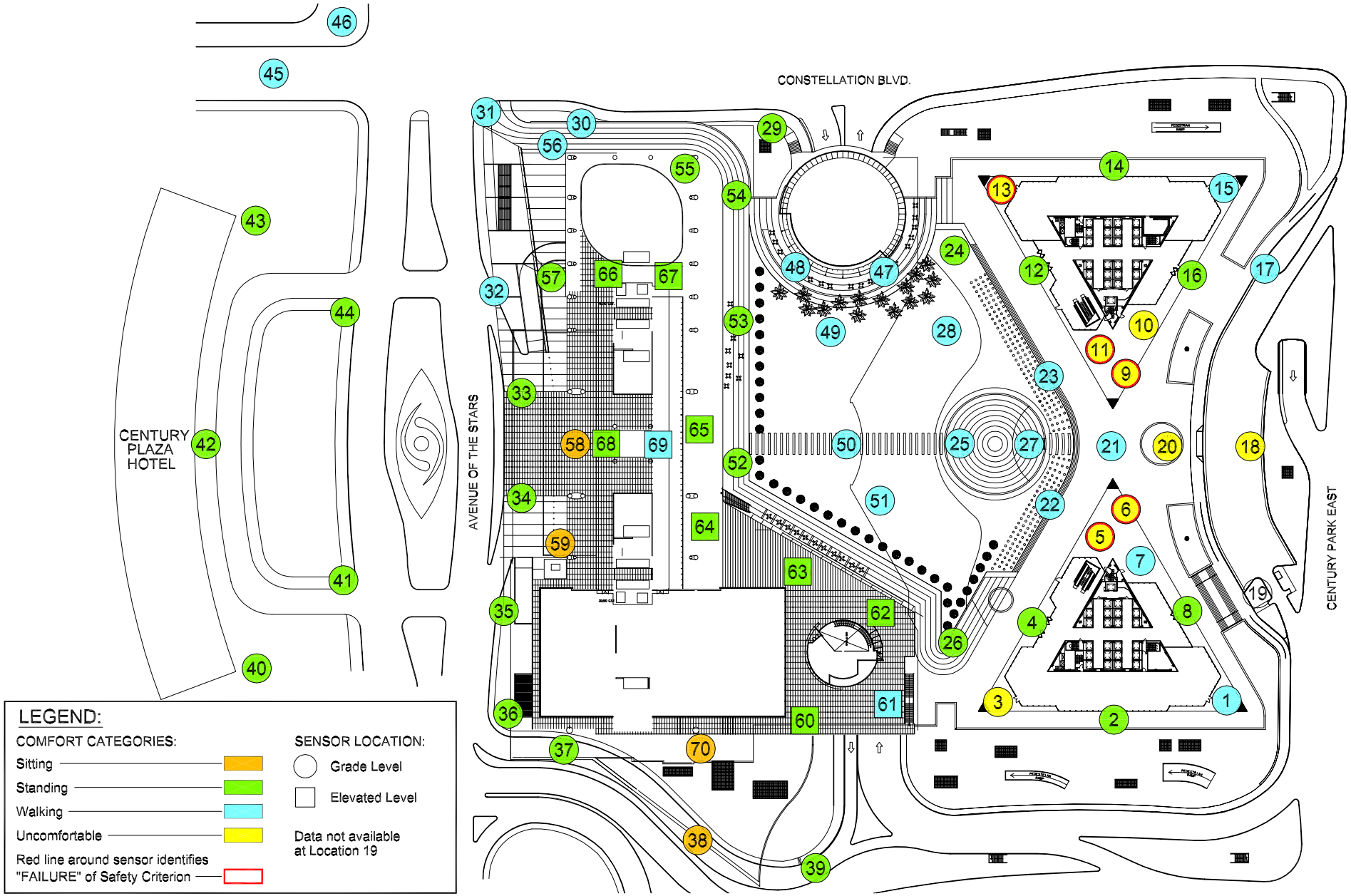
True North

Century City Entertainment Center Redevelopment - Los Angeles, CA

Project #01-400

Drawn by:	CAS	Figure:	3
Approx. Scale:	1" = 130'		
Date Revised:	July 17, 2001		

RWDI



Pedestrian Wind Condition - Winter

True North

Century City Entertainment Center Redevelopment - Los Angeles, CA

Project #01-400

Drawn by:	CAS	Figure:	4
Approx. Scale:	1" = 130'		
Date Revised:	July 17, 2001		

RWDI

APPENDIX A

Table A: List of Drawings and Information Used for Model Construction

The drawings and information listed below were received from Gensler and were used to construct the scale model of the proposed Century City Entertainment Center Redevelopment.

Drawing Title	File Name	Drawing/File Format	Date Drawn (Last Revision)	Date Received
Floor Plan	bp-st.dwg	Email		June 21/2001
Floor Plan	sp-01.dwg	Email		June 21/2001
Floor Plan	bp-02.dwg	Email		June 21/2001
Floor Plan	bp-03.dwg	Email		June 21/2001
Floor Plan	bp-04.dwg	Email		June 21/2001
Floor Plan	bp-11.dwg	Email		June 21/2001
Floor Plan	bp-11.dwg	Email		June 21/2001
Roof Plan	bp-vf.dwg	Email		June 21/2001
Roof Plan	bp-vf2.dwg	Email		June 21/2001
Site Plan	KevP1-16.dwg	Email		June 21/2001
S. Elevation	ee-S.dwg	Email		June 21/2001
N. Elevation	ee-S.dwg	Email		June 21/2001
W. Elevation	ee-W.dwg	Email		June 21/2001
E. Elevation	ee-E.dwg	Email		June 21/2001
Section	ee-Plaza.dwg	Email		June 21/2001
Section	ee-Plaza-1New.dwg	Email		June 21/2001
Section	PS-w.dwg	Email		June 21/2001
Section	PS-E.dwg	Email		June 21/2001
Section	Ps-T.dwg	Email		June 21/2001
Section	PS-L.dwg	Email		June 21/2001
Section	PS-13.dwg	Email		June 21/2001
Section	bs-L.dwg	Email		June 21/2001
Section	bs-T.dwg	Email		June 21/2001