June 9, 2006

Mr. Aaron Clark
Land Use/Government Specialist
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Los Angeles, California
90024

RWDI
CONSULTING ENGINEERS & SCIENTISTS

Rowan Williams
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A member of the RWDI Group of Companies

Re: Fisherman's Village - Wind Study
Marina del Rey, California
RWDI Reference No. 04-1692B

Email: aaron@ag-landuse.com

Dear Aaron:

As per your request, this letter summarizes our opinions as to the effects on the marina wind conditions that may be caused by recent design changes to Fisherman's Village.

RWDI conducted a wind tunnel study in 2004 for the proposed Fisherman's Village in Marina del Rey, California. A final report was issued on September 17, 2004, including assessments of the effects of the proposed development on wind patterns within the marina and general air circulation.

It was concluded in the report that the overall wind conditions with the proposed development in place would be similar to those presently experienced in and around the marina and, therefore, the general air circulation patterns and the use of surface winds by birds will not be affected by the proposed development.

Recently, the design of Fisherman's Village was changed slightly. A one story building in the middle of the development was increased to four stories, the same height as the proposed building to its immediate north, as shown in the attached Elevation.

The proposed Fisherman's Village is located on the east side of the Main Channel and Basins A and B. As shown in Figures 3a, 3b and 3c of the September 17, 2004 report, the original design does not affect wind conditions in and around the marina for the southwest, west-southwest and west directions. Overall, similar wind conditions are expected with the revised design for these wind directions, which are predominant in the Marina del Rey area.

For winds from the east direction, localized wind effects were observed immediately adjacent to the proposed development, as shown in Figure 3d of the September 17, 2004 report, which is also attached for reference. This is particularly evident at Locations 9 and 12 behind the two taller (four stories) buildings. In the revised design, a one story building is to be replaced by a four story building and, as a result, wind conditions at Location 10 are expected to be affected by the design change to the extent similar to that at Locations 9 and 12. Wind effects at other locations in Figure 3d are expected to remain the same between the original and revised designs.

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As stated in our September 17, 2004 report, the east winds have a relatively low frequency among the four predominant wind directions. The effect of the proposed development is limited to the Main Channel area adjacent to the Fisherman's Village. As mariners who use docks at the Fisherman's Village are in the final stages of docking, it is assumed that these localized changes in wind speed and direction will not be an issue.

Pedestrian wind comfort was not in the scope of our 2004 wind study for the proposed Fisherman's Village. However, we have conducted many pedestrian wind studies in the Los Angeles and surrounding areas. Considering the generally low wind speeds in the Marina del Rey area, and the limited building heights (either one or four stories), the resulting wind conditions in the gaps between the proposed buildings are likely to be appropriate for pedestrians standing and walking. If possible, passive pedestrian activities (such as sitting) should be planned in the areas east of the proposed buildings, not in the gaps between these buildings. Otherwise, wind control measures should be considered in the form of landscaping and/or wind screens on the west side of seating areas.

The above opinion is based on the wind tunnel data, revised design information of Fisherman's Village, local wind climate and our experience and engineering judgement. If you have any questions in this regard, please do not hesitate to contact us.

Your very truly,

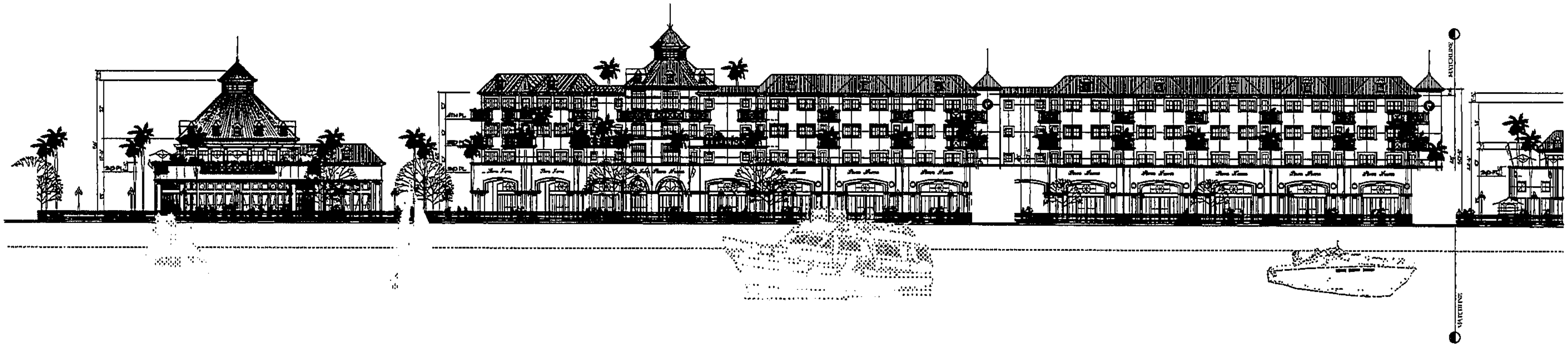
ROWAN WILLIAMS DAVIES & IRWIN Inc.

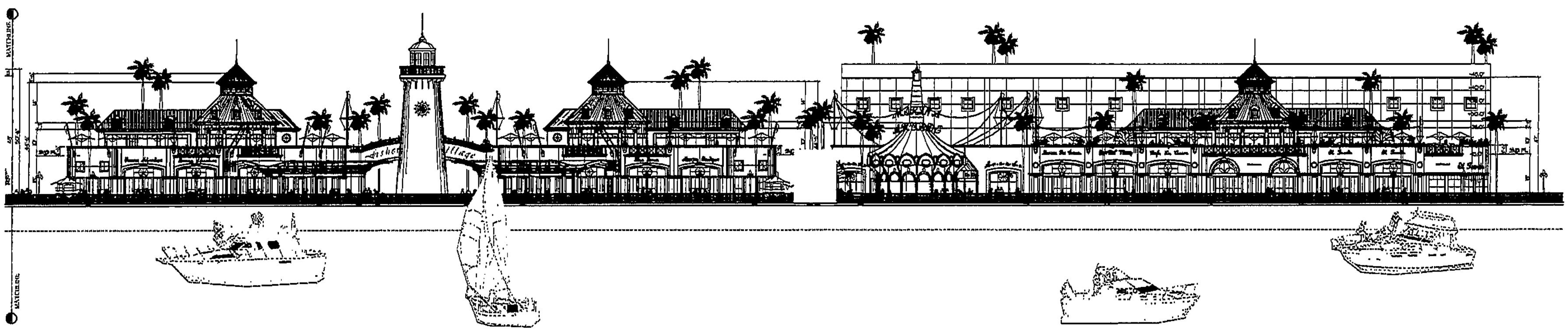
Hanqing Wu, Ph.D., P.Eng.
Senior Specialist / Associate

Dan Bacon
Senior Project Manager / Associate

DEB/smd
Attach.

ATTACHMENTS





SCALE : 1/16" = 1'-0"

WEST ELEVATION

ARCHITECT

THE USE OF THESE PLANS AND SPECIFICATIONS SHALL BE RESTRICTED TO THE ORIGINAL SITE FOR WHICH THEY WERE PREPARED AND PUBLICATION THEREOF IS EXPRESSLY LIMITED TO SUCH USE.

DATE	ISSUED FOR	DATE	REVISION	DATE	REVISION

Jack Hollander & Associates, Inc.
Architecture Planning Interiors

PROJECT
Fisherman's Village
PARCEL 55, 56 & W
FIJI WAY
MARINA DEL REY, CALIFORNIA

JOB NO. M0031
DRAWN BY J.T.
APPROVED BY

SHEET TITLE: WEST ELEVATION
SCALE: 1/16"-1'-0"

SHEET NO. A-5

WIND STUDY

FISHERMAN'S VILLAGE

MARINA DEL REY, CALIFORNIA

Project Number: 04-1692A

Date: September 17, 2004

Submitted by: Rowan Williams Davies & Irwin Inc.

Project Engineer - Hanqing Wu, Ph.D., P.Eng.

Project Manager - Dan Bacon

Project Director - Colin Williams, Ph.D., P.Eng.

Submitted to: Pacific Ocean Management LLC

Armbruster & Goldsmith LLP

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1. INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was requested by Pacific Ocean Management LLC and Armbruster & Goldsmith LLP in Los Angeles to undertake a detailed wind study on the proposed Fisherman's Village in Marina del Rey, California. The study addressed the wind study requirements of the Los Angeles County Zoning Code, including an assessment of the effects of the proposed development and/or building placement on wind patterns within the marina, loss of surface winds used by sailboats and birds, and general air circulation.

2. TEST METHODOLOGY

Wind tunnel tests were conducted on a scale model of a section of Marina del Rey to determine the impact on the wind conditions resulting from the proposed Fisherman's Village. This report provides a summary of the results of these wind tunnel tests on water and land-based locations.

A 1:500 scale model of the study area and the proposed developments were assembled as shown in Figures 1a and 1b. Tests were conducted to simulate and measure wind conditions as they exist today (Figure 1a) and after the proposed Fisherman's Village (Figure 1b).

The results presented in this report pertain to the model of the proposed Fisherman's Village constructed using the architectural design drawings received by RWDI on August 18, 2004 and other in-house information, such as city maps and aerial photos. Note that some small existing buildings currently on the development site were not included in the Existing Configuration in order to assess the worst-case wind impact of the proposed development. Also, two surface parking lots on the east side of Fiji Way were interpreted from available aerial photos as low structures. These areas are farther away from the main channel and were present for both Existing and Proposed Configurations in the wind tunnel testing (Figures 1a and 1b). In addition, the predominant winds in the Marina del Rey area are from the west and southwest directions, and the easterly winds are of relatively low frequencies. Therefore, the above model variations will not alter the conclusion of the current wind study.

The wind tunnel model was instrumented with a total of 40 wind sensors at the Main Channel, Basins A, B and H, and land locations close to the proposed development. It was tested in RWDI's boundary layer wind tunnel for the predominant wind directions, which are west, west-southwest, southwest, and east. The sensors were developed by RWDI for use on scale models and are capable of measuring both changes in wind speed and wind direction.

The wind tunnel results for all predominant wind directions in the Los Angeles area have been examined in detail and are presented in this report. The west, west-southwest, southwest and east wind directions together account for winds that occur a majority of the time, as shown on Figure 2. The wind roses on Figure 2 show the percentage of the time that wind blows from each of 16 directions during spring, summer, fall and winter for the hours of 7:00 am through 9:00 pm, when most sailing would occur. All of the tests were conducted for the above four wind directions.

Information on the changes in wind speed and direction recorded at each sensor location can be obtained from Figures 3a through 3d for the four wind directions tested for the existing and proposed conditions. Each figure presents local wind data at each location for one of the four approaching wind directions that were tested. The length of the arrows is proportional to the speed of the wind at each location. In each figure there are two colour coded arrows at each sensor location: black to indicate the local wind direction for existing site conditions and red for the proposed Fisherman's Village.

The wind analysis considered if the proposed development would result in changes to the local wind direction or mean speed between adjacent sensors that are greater than the difference presently experienced between any two adjacent sensors. Until criteria are established by the County of Los Angeles, this is the best method of assessing the impact of the proposed developments on the sailing conditions in the marina.

3. EFFECTS ON SAILING CONDITIONS

3.1 Locations On Water (4 through 40)

For the southwest, west-southwest and west wind directions (Figures 3a through 3c), the red arrows (proposed conditions) are aligned closely with the black arrows (existing conditions) and have a similar length at all measurement locations on the Main Channel and Basins A, B and H. Therefore, the wind direction and speed are not affected by the addition of the proposed Fisherman's Village for these wind directions which are predominant in the Marina del Rey area.

Differences in wind speed and direction between the existing and proposed conditions occurred on the Main Channel close to the proposed Fisherman's Village (Locations 9 through 12) when winds are from the east direction (Figure 3d). Specifically, east winds were switched to the northeast at Locations 9 and 12 and a considerable wind speed reduction occurred at Locations 9, 10 and 12, as shown in Figure 3d. To a lesser extent, differences also occurred further away from the proposed development at Locations 20 through 22, and became insignificant at Locations 27 and 28. No changes in wind speed or direction were found in other locations for the east winds (Figure 3d).

As shown in Figure 2, the east winds have a relatively low frequency among the four predominant wind directions. The effect of the proposed development is limited to the Main Channel area adjacent to the Fisherman's Village. As mariners who use docks at the Fisherman's Village are in the final stages of docking ,it is assumed that these localized changes in wind speed and direction will not be an issue. Other mariners sailing from or to docking basins in Marina del Rey can use the central or west half of the Main Channel, where the east winds had minimal effects.

3.2 Locations on Land

Wind sensors were installed on land (Locations 1 through 3) to measure changes in wind direction and speed in areas close to the proposed Fisherman's Village.

Generally, at Locations 1 and 3, no changes in wind speed or direction were observed for any of the test directions (Figures 3a through 3d). However, at Location 2 the proposed development was found to cause a reduction in wind speed for winds from the southwest and west-southwest directions (Figures 3a and 3b, respectively). No changes were observed for the other two test wind directions (Figures 3c and 3d). The reduction in wind speed is considered a positive effect on pedestrian wind conditions.

4. LOSS OF SURFACE WINDS USED BY BIRDS

In order to assess the effects on birds of changes in the surface winds a report was prepared by an expert in the aerodynamics, kinematics and behavior of birds. This report has been attached as Appendix A. The author of the report considered the following issues:

- the types of birds likely to inhabit Marina del Rey
- the ability of birds to take off and land,
- soaring conditions upwind and downwind of the proposed building,
- effects on local thermal soaring conditions, and
- changes to flight efficiency due to turbulence.

From our test results, the minimal change on existing wind fields due to the proposed development will not result in changes to the birds' use of the area.

5. GENERAL AIR CIRCULATION PATTERNS

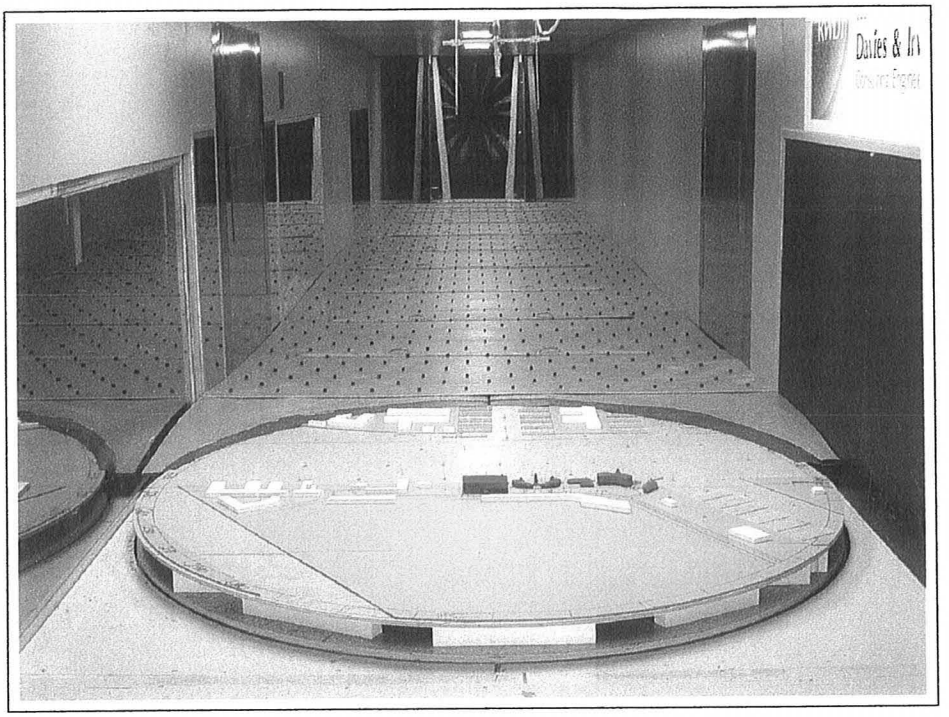
Changes in wind speed and direction were recorded only in the immediate vicinity of the proposed development. Due to the localized nature of these changes there will be no effect on the general air circulation patterns within Marina del Rey.

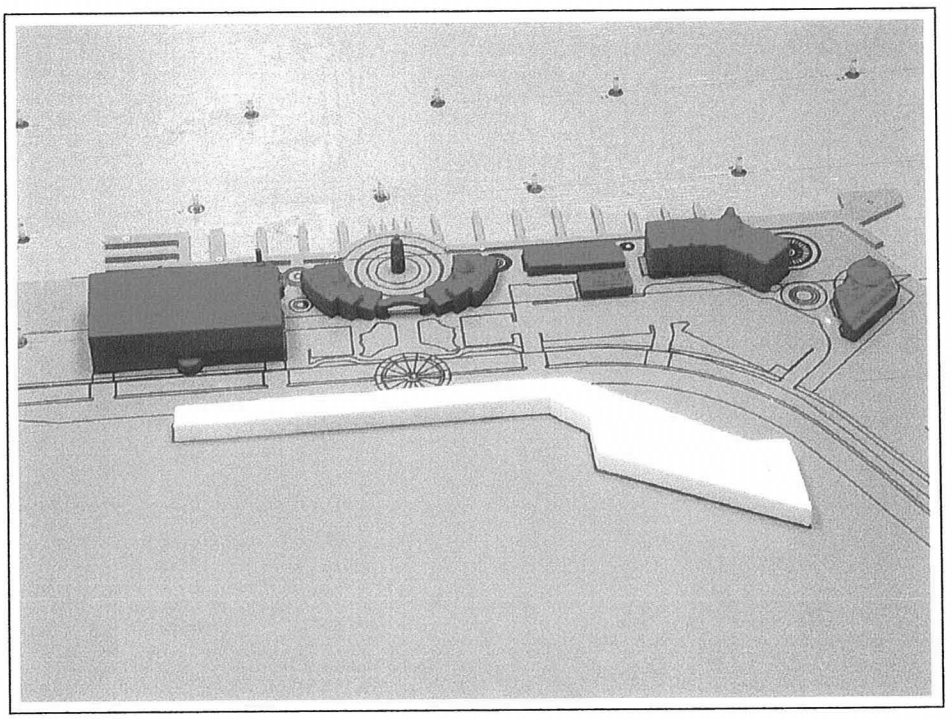
6. CONCLUSIONS

From the results of this wind study, it has been concluded that the proposed Fisherman's Village will not affect the existing wind conditions over a majority of the areas of Marina del Rey. There will be areas of altered wind speed and direction in the Main Channel adjacent to the proposed development when winds are from the east. This is not an issue considering the boating activities in these localized areas. Due to the localized nature of these changes and the low frequency associated with the easterly winds, there will be no significant effect on the general air circulation patterns within the Main Channel and Basins in Marina del Rey.

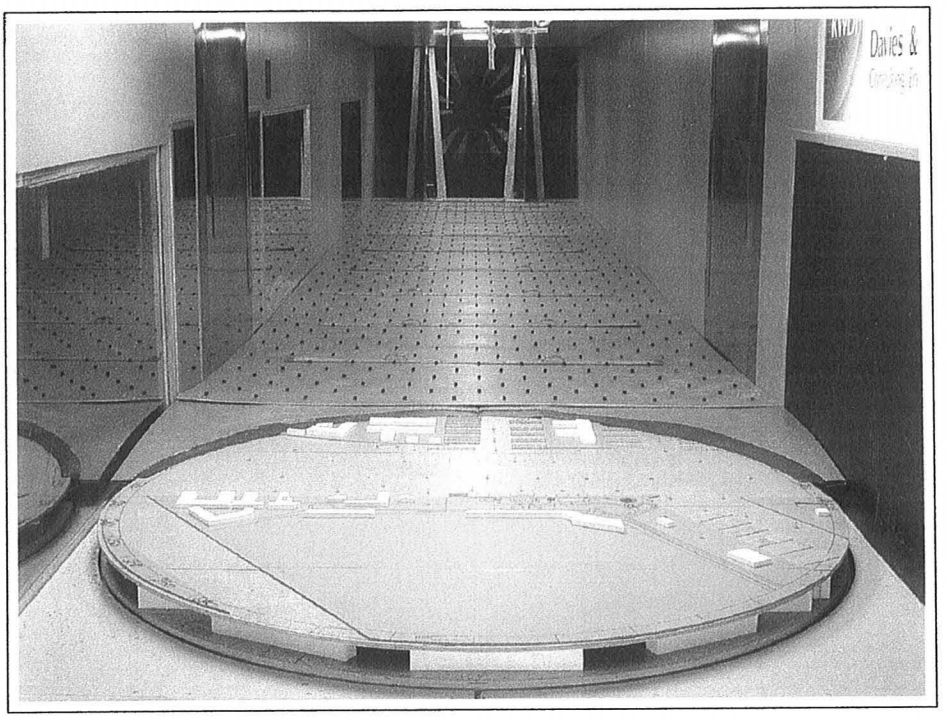
The overall wind conditions predicted with the proposed development in place are similar to those presently experienced in and around the marina and therefore the general air circulation patterns and the use of surface winds by birds will not be affected.

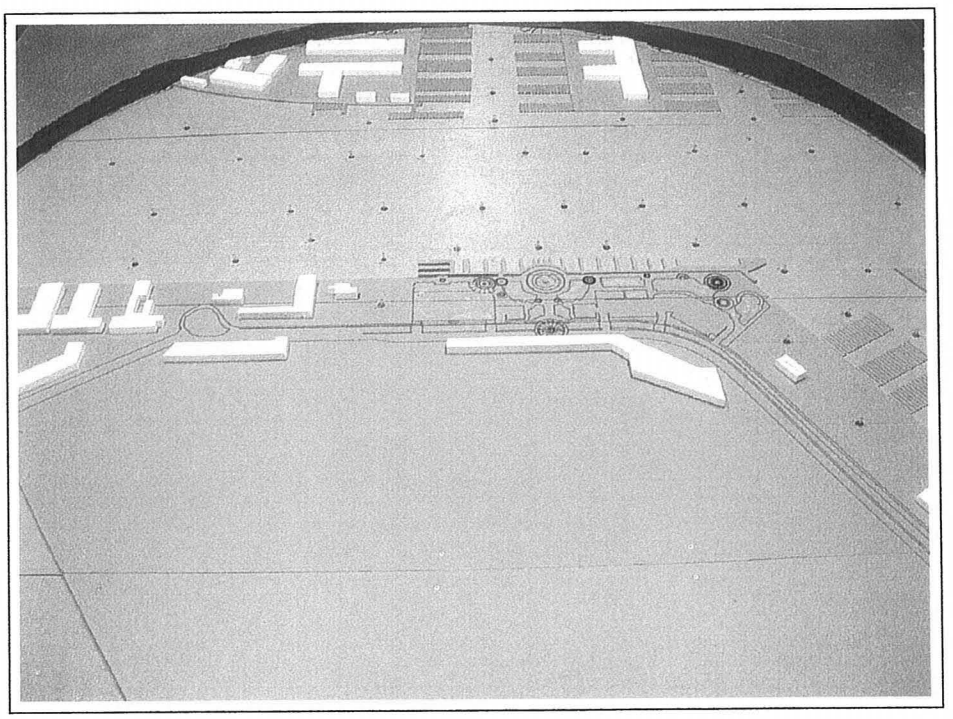
FIGURES



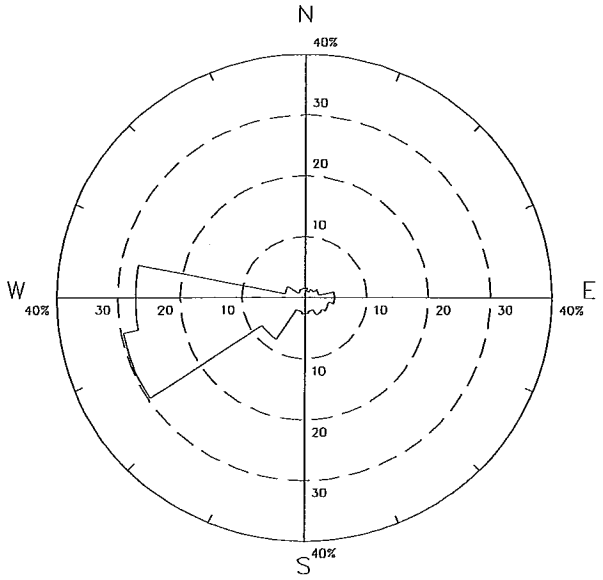


Wind Tunnel Study Model **Proposed Configuration** Fisherman's Village - Marina del Rey, California Project #04-1692	Figure No. 1b Date: September 1, 2004	RWDI

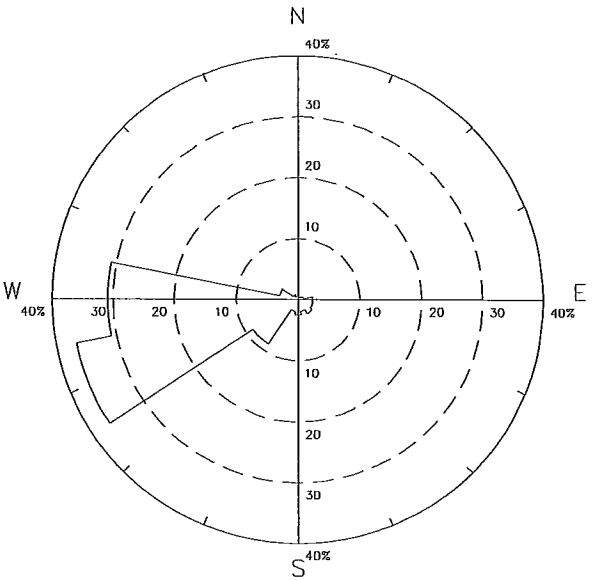




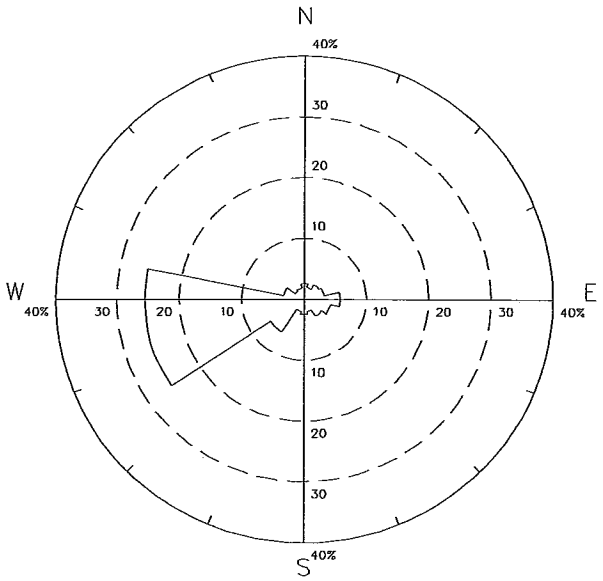
Wind Tunnel Study Model **Existing Configuration** Fisherman's Village - Marina del Rey, California Project #04-1692	Figure No. 1a Date: September 1, 2004	RWDI



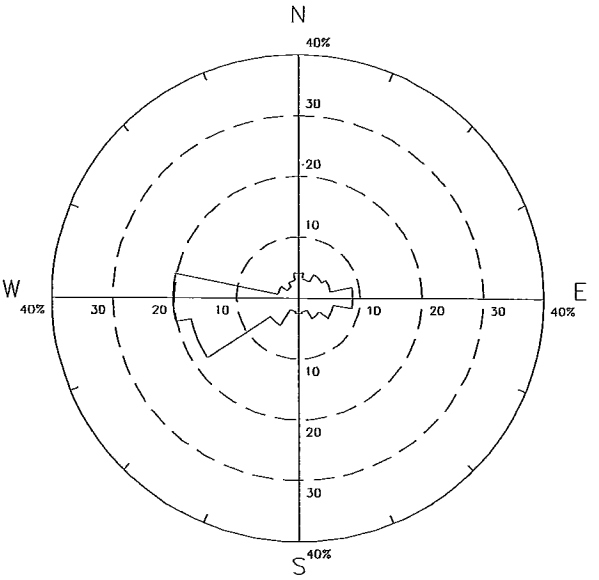
SPRING
(March, April, May)



SUMMER
(June, July, August)

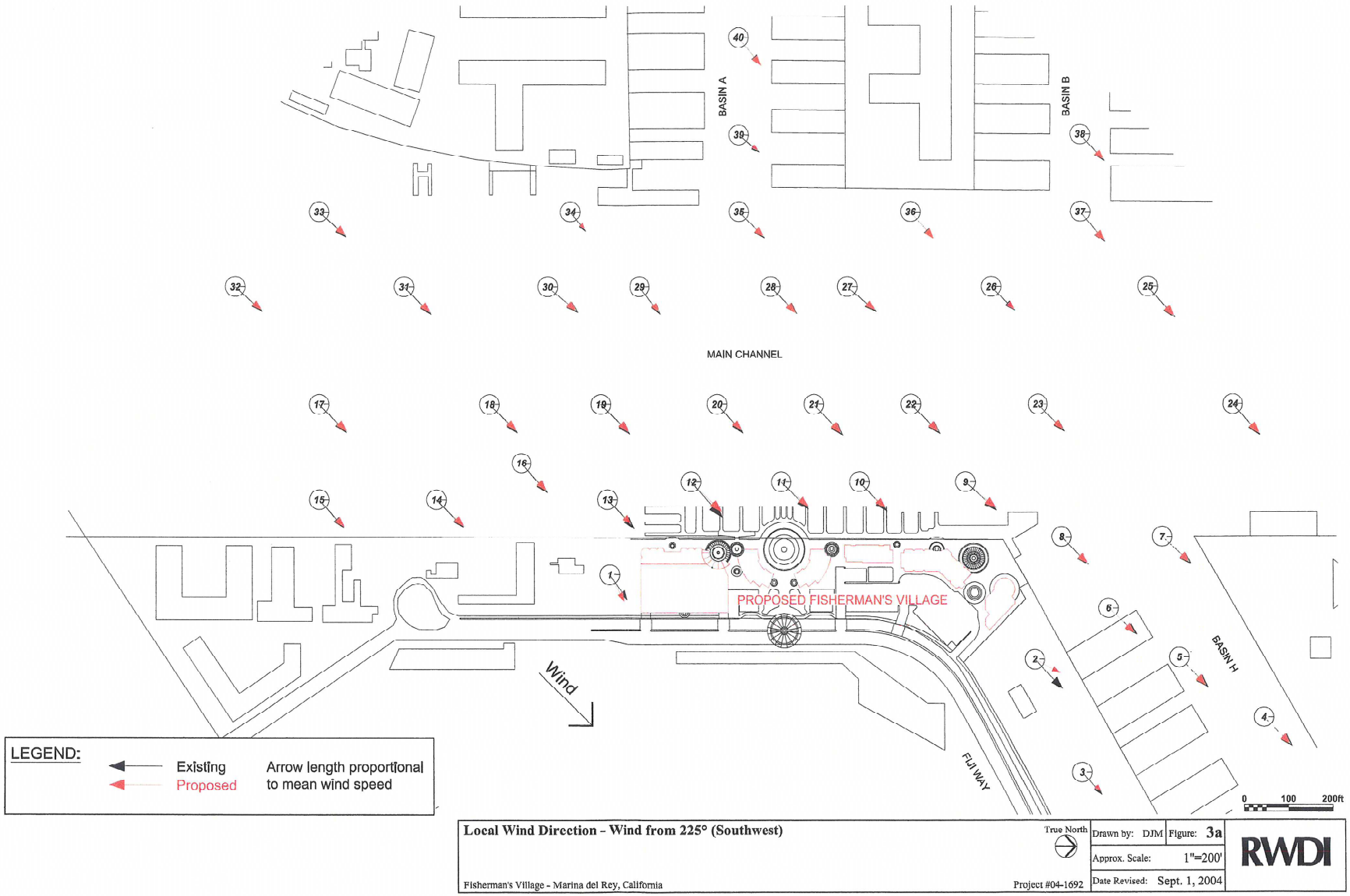


FALL
(September, October, November)



WINTER
(December, January, February)

Directional Distribution of Seasonal Winds **(7:00 am - 9:00 pm)** **Los Angeles International Airport (1947 - 1990)**	Figure No. 2	RWDI
Fisherman's Village - Marina del Rey, California Project #04-1692	Date: September 3, 2004	



Local Wind Direction - Wind from 225° (Southwest)

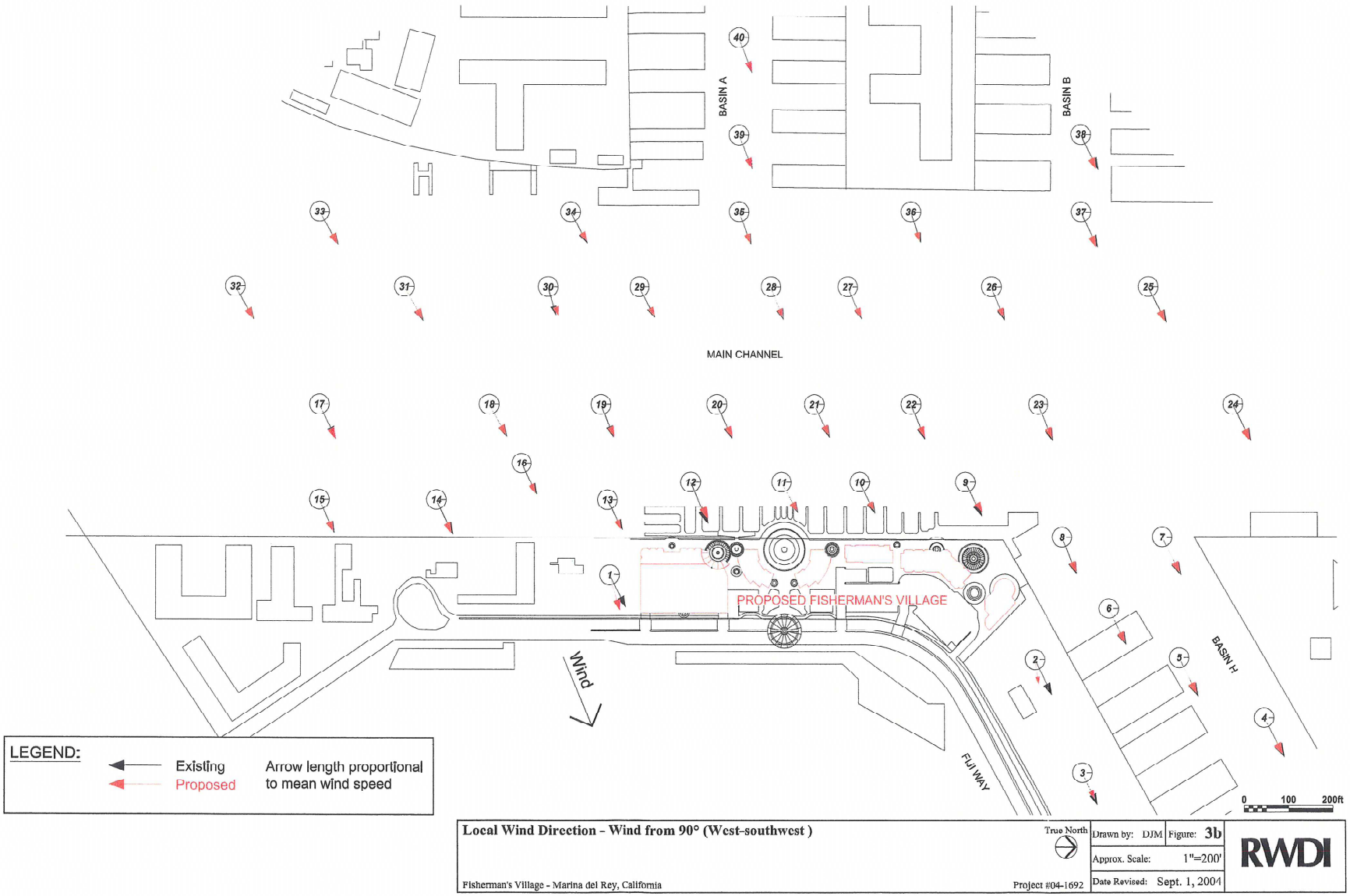
True North

Fisherman's Village - Marina del Rey, California

Project #04-1692

Drawn by: DJM	Figure: 3a
Approx. Scale:	1"=200'
Date Revised:	Sept. 1, 2004

RWDI



Local Wind Direction - Wind from 90° (West-southwest)

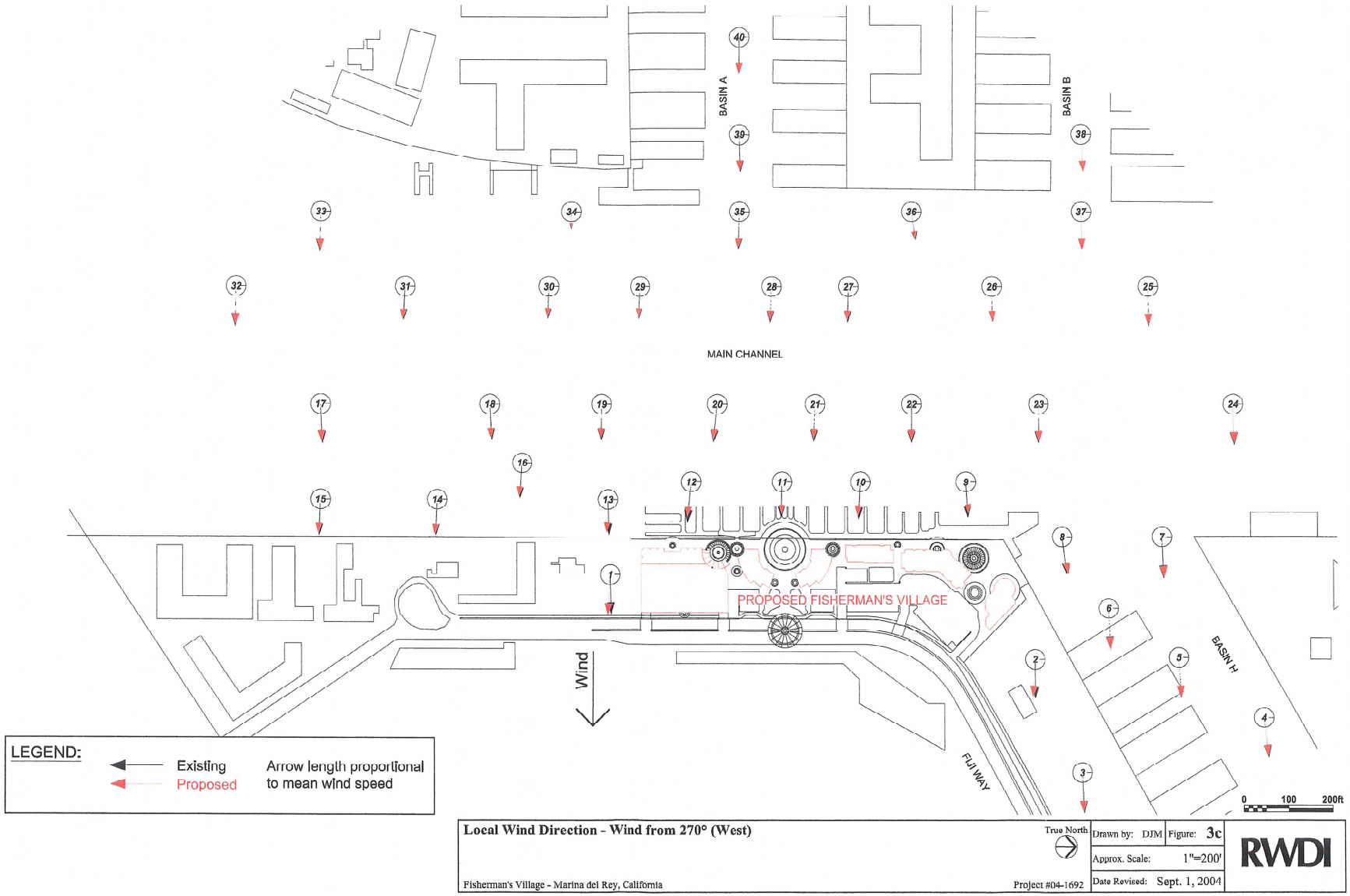
True North

Fisherman's Village - Marina del Rey, California

Project #04-1692

Drawn by: DJM	Figure: 3b
Approx. Scale:	1"=200'
Date Revised:	Sept. 1, 2004

RWDI



Local Wind Direction - Wind from 270° (West)

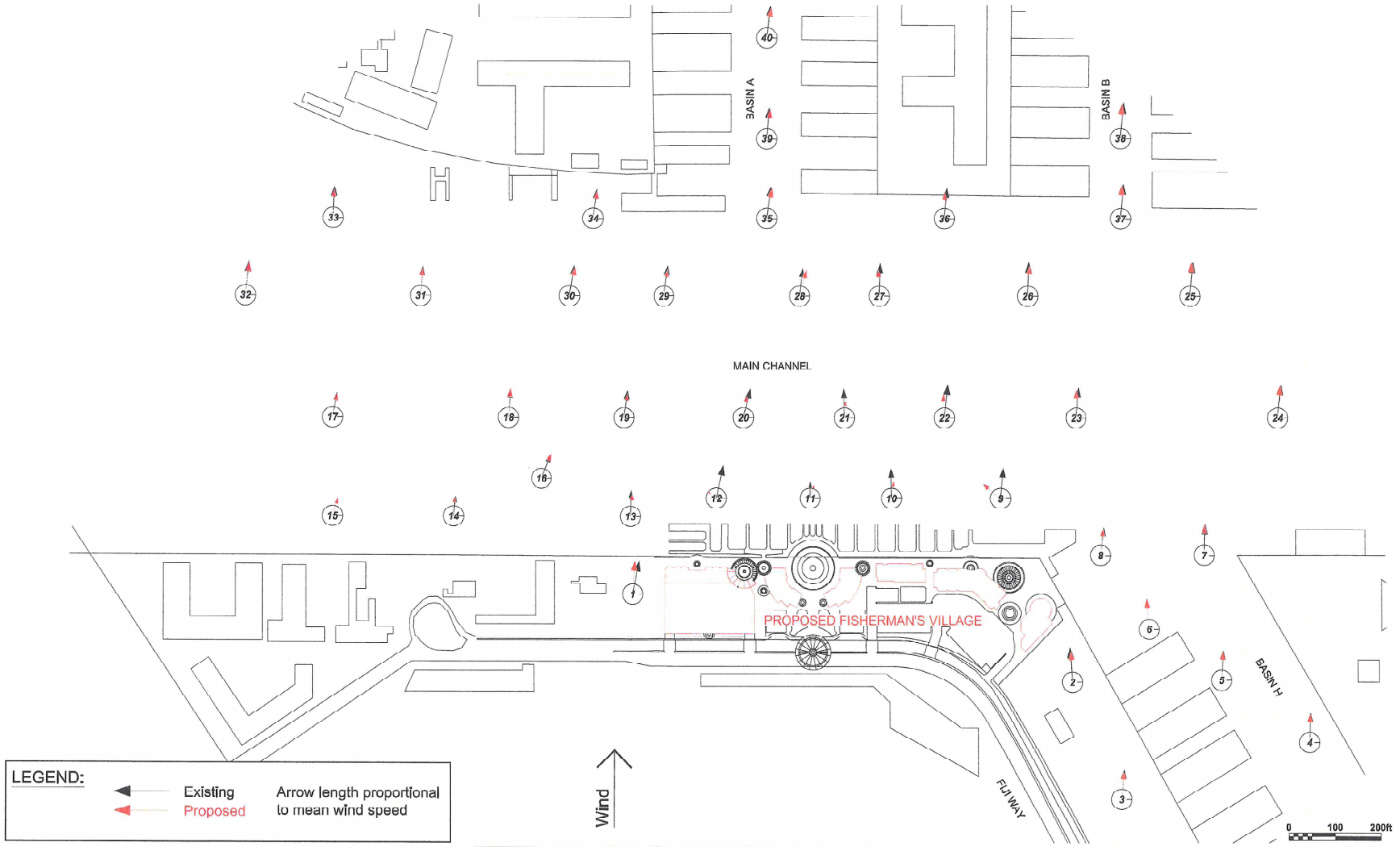
True North

Fisherman's Village - Marina del Rey, California

Project #04-1692

Drawn by:	DJM	Figure:	3c
Approx. Scale:			1"=200'
Date Revised:			Sept. 1, 2004

RWDI



Local Wind Direction - Wind from 90° (East)

True North

Fisherman's Village - Marina del Rey, California

Project #04-1692

Drawn by: DJM	Figure: 3d	RWDI
Approx. Scale:	1"=200'	
Date Revised:	Sept. 1, 2004	