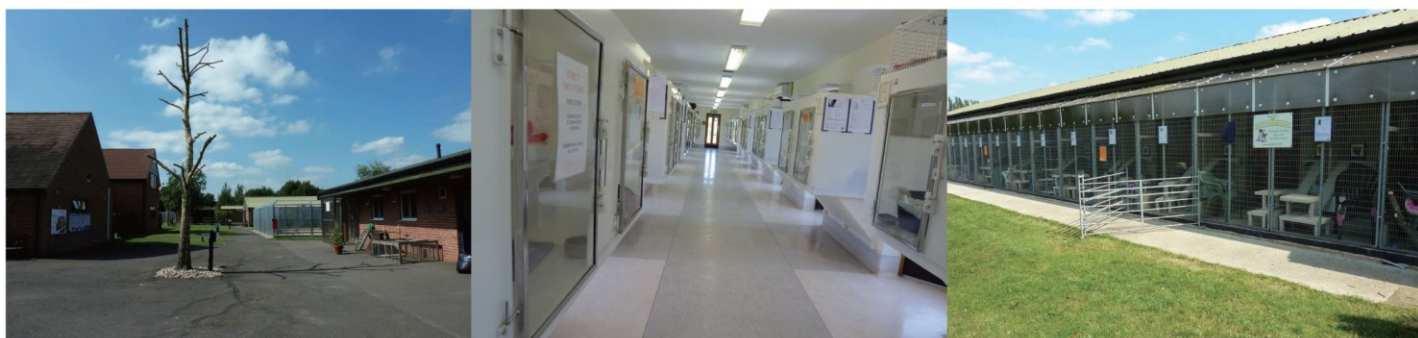


專業動物

改善動物福利及增進流浪犬社會功能系列計畫二——3

收容所設計與建築

工作坊



Richard S. Bacon

總裁及首席建築師，貝肯建築師事務所(Bacon Group, Inc.)



Mindy M. Bacon

副總裁兼行政暨行銷總監，貝肯建築師事務所(Bacon Group, Inc.)



●主辦單位：臺大獸醫專業學院「關懷生命，愛護動物專案」、臺北市動物保護處、臺灣動物社會研究會、國際人道對待動物協會 ●日期：2011年10月21日（星期五） ●時間：上午9:00~下午6:30 ●地點：臺大動物醫院B1演講廳

「專業動物收容所設計與建築」工作坊

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主講者：Richard S. Bacon，貝肯建築師事務所首席建築師

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註：感謝大肇建築師事務所協助校訂。

「專業動物收容所設計與建築」工作坊 議程

2011年10月21日(五)

8:30~8:50	報 到
8:50~9:00	引言、致詞 【葉力森教授，臺灣大學獸醫專業學院】 【嚴一峯處長，臺北市動物保護處】
9:00~10:30	規劃與設施計畫 (Program and Facility Planning) 【Richard S. Bacon，貝肯建築師事務所首席建築師】
10:30~12:00	動物欄舍與其他空間(一) (Animal Housing and Other Spaces) 【Richard S. Bacon，貝肯建築師事務所首席建築師】
12:00~13:00	午 餐
13:00~13:30	動物欄舍與其他空間(二) (Animal Housing and Other Spaces) 【Richard S. Bacon，貝肯建築師事務所首席建築師】
13:30~15:30	材料、排水與暖通空調 (Materials, Plumbing, HVAC) 【Richard S. Bacon，貝肯建築師事務所首席建築師】
15:30~16:00	休 息 茶 敘
16:00~17:30	建築施作議題 (Construction Issues) 【Richard S. Bacon，貝肯建築師事務所首席建築師】
17:30~18:30	綜合討論 【Richard S. Bacon，貝肯建築師事務所首席建築師】 【朱增宏執行長，臺灣動物社會研究會】 【葉力森教授，臺灣大學獸醫專業學院】 【嚴一峯處長，臺灣動物保護處】

※備註：疾病與噪音控制問題，將於不同主題中分別探討。

講師簡介



Richard S. Bacon

總裁及首席建築師

貝肯建築師事務所 (Bacon Group, Inc.)

貝肯先生在建築界具有 30 年以上的資歷，累積了包括設計及生產部門管理方面的多元經驗。設計項目涵蓋廣泛，包括運輸設施、辦公大樓、緊急服務設施、倉儲設備、動物收容中心以及公眾或私人休憩園地等。他也不斷精進其他專業技能，如：遵循美國聯邦殘障法(ADA)的設計準則、屋頂系統、設計／建築專案管理及協調技巧等。

為美國國內著名的動物收容所設計顧問和相關工作坊主辦人，為 HSUS、美國寄宿犬舍協會，現為寵物護理服務協會 (Pet Care Services Association) 及佛羅里達獸醫協會所設計的動物照護設施提供諮詢服務。曾為 26 個州的動物照護和管制機構、人道照護機構、寵物住宿或安親中心，設計動物照護設施或擔任設計顧問一職，各項專案內容，請見英文簡歷 (Representative Projects)。

登入 HSUS 網站上的資源區，可以下載貝肯建築師事務所義務為小型收容所繪製的建築平面圖，共有三個方案。在 HSUS 的會員刊物 All Animals 上也有一篇題為 “The Accidental Cat Lady” 的文章，探討野生貓舍的設計，提供建築步驟說明及圖示。HSUS 網站上亦可免費下載建築平面圖。



Mindy M. Bacon

副總裁兼行政暨行銷總監

貝肯建築師事務所 (Bacon Group, Inc.)

Mindy 具有管理碩士學位，並持有專業服務行銷學會 the Society for Marketing Professional Services (SMPS)的專業服務行銷師 Certified Professional Services Marketer (CPSM)執照。

具教學、團隊引導、策略行銷企劃、公共關係企劃等方面的豐富經驗，協助客戶及設計團隊成員解決問題、或達成共識。

身為動物收容所專案經理，Mindy 主導所有相關設計專案、社區活動、教育訓練課程及設計工作坊的運作，也掌管各類影像記錄。並編撰刊載在產業相關期刊或雜誌上的文章，主題包括收容所設計技巧及所使用的建材等。

Mindy 也是公司與其他人道照護以及動物保護組織聯繫的窗口。身為美國人道協會 (HSUS) 等動物保護組織的成員，她曾參與許多動物收容照護機構的維修專案，提供空間需求分析、場地分析報告及經費籌募視覺統籌等專業服務 (見英文簡歷, Representative Projects)，所撰寫的教育報告，也多被收錄在貝肯建築師事務所為 HSUS 等團體，舉辦動物收容設計研討會的參考資料 (見英文簡歷 Presentations/Seminar)。

Welcome

Professional Animal Shelter
Design & Construction

Presented by

Richard S. Bacon, AIA, LEED-AP BD+C, CGC



Welcome

專業動物收容所設計與建築

主講者

Richard S. Bacon, AIA, LEED-AP BD+C, CGC



About Your Presenter

Richard (Rick) S. Bacon, AIA



- 36 yrs. experience as an architect
- LEED accredited & licensed General Contractor
- Member Society of Animal Welfare Administrators, Association of Shelter Veterinarians, National Animal Control Association, and The Humane Society of the United States
- Designed / consulted on over 112 animal services projects
- Design workshop leader for humane care, animal control, veterinary, and animal boarding organizations
- Published design articles and industry expert for animal care industry publications

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主講者介紹

Richard (Rick) S. Bacon, AIA



- 36年的建築師資歷
- LEED認證綜合營造商/一般承包商
- 現為動物福利專業行政人員協會、收容所獸醫協會、國家動物管制協會以及美國人道協會的會員
- 曾在超過112個動物服務計畫中主掌設計或擔任顧問
- 曾為人道照護、動物管制、動物醫療及寵物旅館等組織籌辦設計工作坊
- 多次在動物照護產業刊物上發表設計相關文章

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Program and Facility Planning

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Richard S. Bacon, AIA, LEED-AP BD+C, CGC



專業動物收容所設計與建築

規劃與設施計畫

主講者

Richard S. Bacon, AIA, LEED-AP BD+C, CGC



Learning Objectives

- Understand basic housing categories
- How to determine animal housing capacity
- Understand room requirements (such as equipment & finishes)
- Learn departmental adjacencies
- Understand overall building flow & function

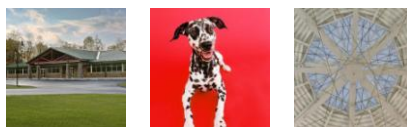


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學習目標

- 了解所內空間的基本配置
- 如何推定動物收容量
- 了解個別空間的需求（如：設備及塗裝）
- 了解各部門相對位置的關聯性
- 了解整體建築流程及功能



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What is an animal shelter?

“Because of their unique services, animal shelters must have the disease-prevention components of a hospital, the functional capabilities of a police station, and the user-friendly appeal of a library.”

Geoffrey L. Handy, The Humane Society of the United States

“We need to provide conditions that are safe and clean, that give protection from disease and relief from stress, that provide for the basic behavioral as well as physical needs of animals.”

Koret Shelter Medicine Program
University of California, Davis website

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何謂動物收容所？

為因應所提供的獨特服務，動物收容所必須兼具醫院的防疫機制、警察局的運作效能，以及圖書館的人性化設計。

Geoffrey L. Handy, The Humane Society of the United States

我們必須提供安全潔淨的環境，保護動物不受疾病感染、減輕動物壓力，同時也要滿足動物的生理需求及基本的行為需求。

Koret Shelter Medicine Program
University of California, Davis website

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Housing Categories

- Adoption
- Stray / healthy hold
- Kitten & puppy
- Isolation / quarantine (sick)
- Feral / cruelty housing unit
- Temporary holding
- Surgery



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空間配置

- 認養區
- 流浪動物/健康動物區
- 幼貓犬區
- 獨居區/隔離區（生病的動物）
- 野生動物區/受虐動物區
- 暫時留置區
- 手術區



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Other Animal Housing

- Small animals (“pocket pets” like rabbits, hamsters, guinea pigs)
- Exotics (lizards, snakes)
- Farm animals / hoof stock (cows, goats, pigs, horses)
- Fowl (chickens)
- Aviary (parrots, other birds)

其他動物居住區

- 小動物區（兔子、倉鼠、天竺鼠等口袋寵物）
- 珍禽異獸區（蜥蜴、蛇）
- 農場動物/有蹄動物區（牛、羊、豬、馬）
- 家禽區（雞）
- 飛禽區（鸚鵡等鳥類）

Calculations

ADOPTION CATS

1,779 X 14 DAYS (ASSUMED HOLDING PERIOD) = 24,906
CATS

24,906 CATS / 365 DAYS = **69 CATS / DAY**

69 CATS X 10% GROWTH FACTOR = **76 CATS**

69 CATS X 15% GROWTH FACTOR = **80 CATS**

69 CATS X 25% GROWTH FACTOR = **87 CATS**

STRAY/HEALTHY HOLD CATS

5,337 X 5 DAYS (ASSUMED HOLDING PERIOD) = 26,685 CATS

26,685 CATS / 365 DAYS = **74 CATS / DAY**

74 CATS X 10% GROWTH FACTOR = **82 CATS**

74 CATS X 15% GROWTH FACTOR = **86 CATS**

74 CATS X 25% GROWTH FACTOR = **93 CATS**

FERAL/CRUELTY HOUSING UNITS

33 X 5 DAYS (ASSUMED HOLDING PERIOD) = 165 CATS

165 CATS / 365 DAYS = **1 CAT / DAY**

1 CAT X 10% GROWTH FACTOR = **2 CATS**

1 CAT X 15% GROWTH FACTOR = **2 CATS**

1 CAT X 25% GROWTH FACTOR = **2 CATS**

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計算公式

待認養的貓

1,779 X 14 天(預估收容天數) = 24,906 隻

24,906 隻貓 / 365 天 = **69 隻/天**

69 隻 X 10% 預期增長因素 = **76 隻**

69 隻 X 15% 預期增長因素 = **80 隻**

69 隻 X 25% 預期增長因素 = **87 隻**

流浪貓/健康的貓

5,337 X 5 天(預估收容天數) = 26,685 隻

26,685 隻貓 / 365 天 = **74 隻/天**

74 隻 X 10% 預期增長因素 = **82 隻**

74 隻 X 15% 預期增長因素 = **86 隻**

74 隻 X 25% 預期增長因素 = **93 隻**

野貓/受虐貓的居住單位

33 X 5 天(預估收容天數) = 165 隻

165 隻 / 365 天 = **1 隻/天**

1 隻 X 10% 預期增長因素 = **2 隻**

1 隻 X 15% 預期增長因素 = **2 隻**

1 隻 X 25% 預期增長因素 = **2 隻**

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Calculations

HOUSING CALCULATION BASED ON A (5) YEAR AVERAGE:

BASED ON STRAIGHT CALCULATIONS (NO PERCENTAGE APPLIED FOR GROWTH)

CATS	OWNER SURRENDER, ETC.	ADOPTION	STAY/HEALTHY HOLDS	CRUELTY/FERAL
CENSUS PERIOD				
10/01/04 - 9/30/05	25	77	83	1
10/01/05 - 9/30/06	26	69	74	1
10/01/06 - 9/30/07	21	81	86	1
10/01/07 - 9/30/08	15	89	95	1
10/01/08 - 8/30/09	19	81	87	2
AVERAGE	21.2 (22) CATS	79.4 (80) CATS	85 CATS	1.2 (3) CATS

DOGS	OWNER SURRENDER, ETC.	ADOPTIONS	STRAY/HEALTHY HOLD	CRUELTY/FERAL
CENSUS PERIOD				
10/01/04 - 9/30/05	32	55	59	2
10/01/05 - 9/30/06	29	53	57	2
10/01/06 - 9/30/07	29	51	54	3
10/01/07 - 9/30/08	29	51	55	3
10/01/08 - 8/30/09	31	48	52	3
AVERAGE	30 DOGS	51.6 (52) DOGS	55.4 (56) DOGS	2.6 (3) DOGS

SUMMARY

TOTAL CAT HOUSING PER CENSUS
22 OWNER SURRENDER UNITS, ETC
80 ADOPTION UNITS
85 STRAY/HEALTHY HOLD UNITS
3 CRUELTY/FERAL HOLD UNITS
190 CATS

TOTAL DOG HOUSING PER CENSUS
30 OWNER SURRENDER UNITS, ETC
52 ADOPTION UNITS
56 STRAY/HEALTHY HOLD UNITS
3 CRUELTY HOLD UNITS
141 DOGS

NOTE: NEED KITTEN AND PUPPY SPLIT

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計算公式

根據五年內的平均值來推算收容隻數

根據直接運算的結果 (不含預期增長百分比)

貓	飼主棄養等	認養	流浪/健康	受虐/野生
統計期間				
10/01/04 - 9/30/05	25	77	83	1
10/01/05 - 9/30/06	26	69	74	1
10/01/06 - 9/30/07	21	81	86	1
10/01/07 - 9/30/08	15	89	95	1
10/01/08 - 8/30/09	19	81	87	2
平均	21.2 (22) CATS	79.4 (80) CATS	85 CATS	1.2 (3) CATS

狗	飼主棄養等	認養	流浪/健康	受虐/野生
統計期間				
10/01/04 - 9/30/05	32	55	59	2
10/01/05 - 9/30/06	29	53	57	2
10/01/06 - 9/30/07	29	51	54	3
10/01/07 - 9/30/08	29	51	55	3
10/01/08 - 8/30/09	31	48	52	3
平均	30 DOGS	51.6 (52) DOGS	55.4 (56) DOGS	2.6 (3) DOGS

摘要

每年平均需要的籠舍數量
飼主帶來棄養或其他來源的貓 22個居住單位
認養區 80個
流浪貓/健康的貓 85個
受虐貓/野貓區 3個
190隻貓

每年平均需要的狗舍數量
飼主帶來棄養或其他來源的狗 30個
認養區 52個
流浪狗/健康的狗 56個
受虐狗/野狗區 3個
141隻狗

注意：須區分幼貓與幼犬

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Room Requirements

Prep/Treatment Room: 000 SF

- Description
- Space needs
- Adjacencies
- Wall Finishes
- Flooring
- Ceiling
- Doors
- Windows
- Hardware
- Security
- Electrical
- Plumbing
- HVAC
- Millwork
- Equipment
- Furniture
- Special comments

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個別空間的需求

準備/治療室 000 SF

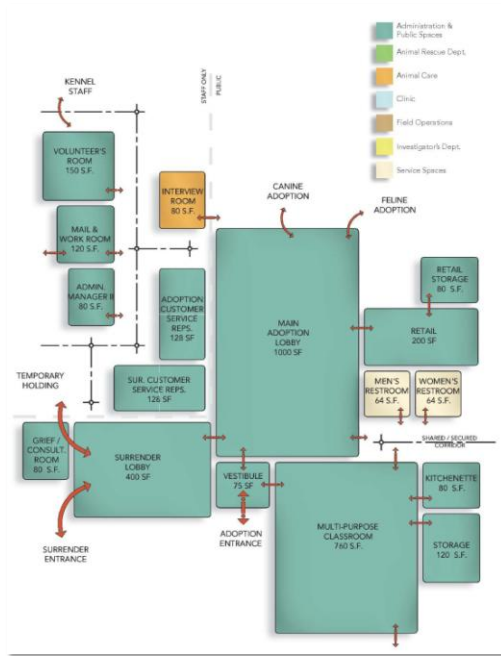
- 描述
- 空間需求
- 鄰接空間
- 牆面粉刷(裝修)
- 地板
- 天花板
- 門
- 窗
- 硬體
- 保全系統
- 電線配置
- 自來水工程
- 暖通空調
- 木作
- 設備
- 家具
- 特別註記

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Departmental Adjacencies

Public Areas

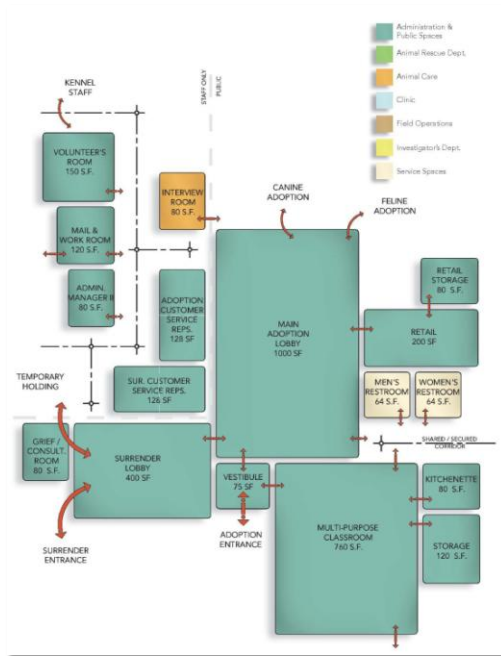


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各部門相對位置

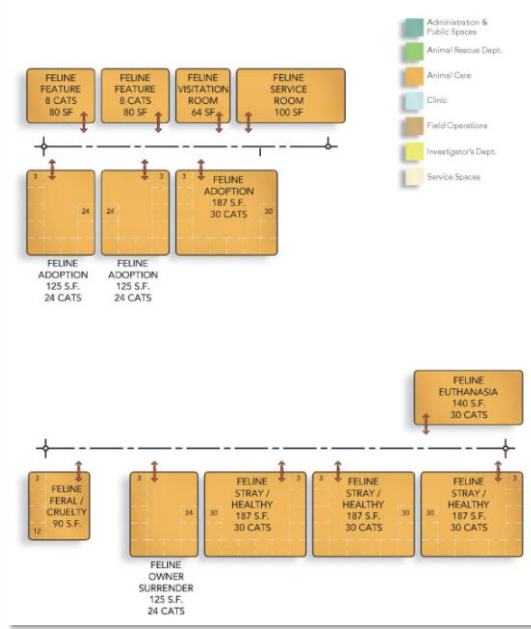
公共區域



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Departmental Adjacencies

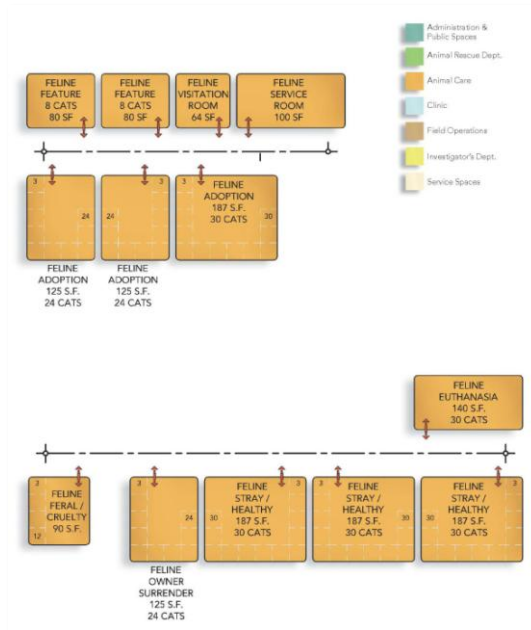


Feline Areas

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各部門相對位置



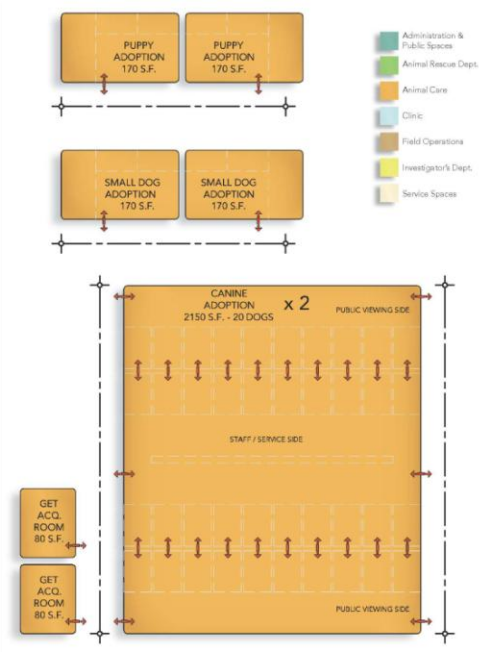
貓舍

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Departmental Adjacencies

Canine Areas

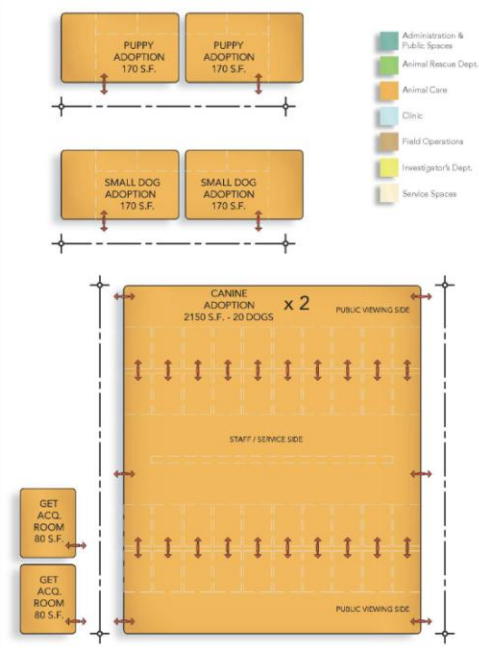


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各部門相對位置

狗舍

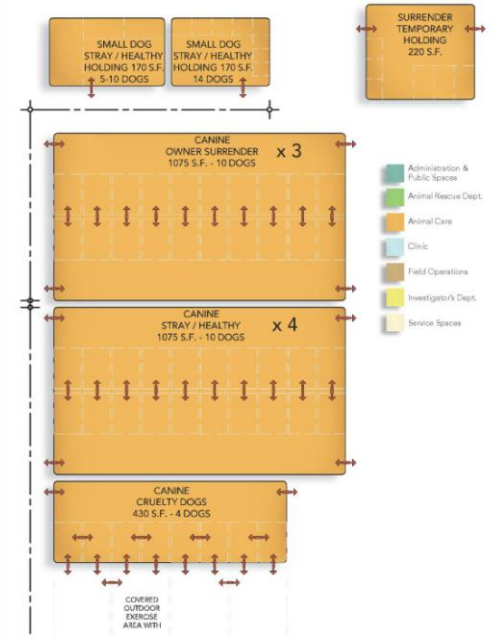


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Canine Areas



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各部門相對位置

狗舍

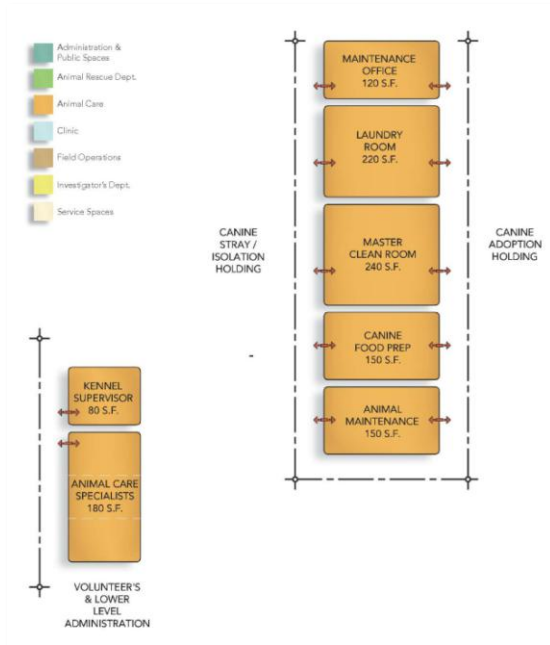


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Departmental Adjacencies

Staff Work Areas

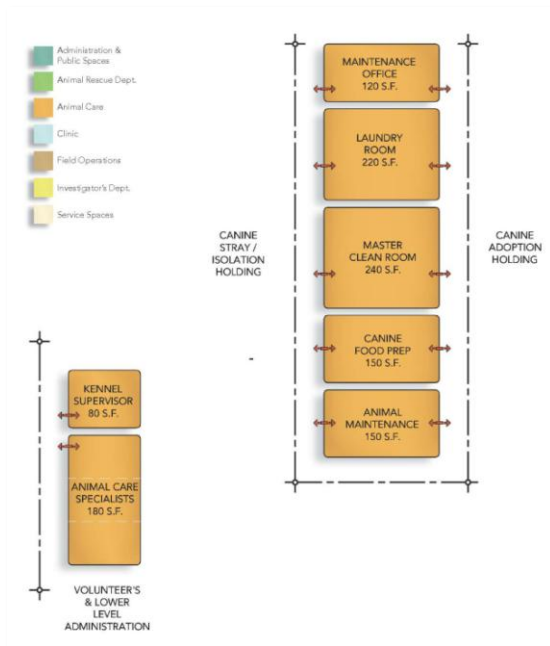


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各部門相對位置

人員工作區

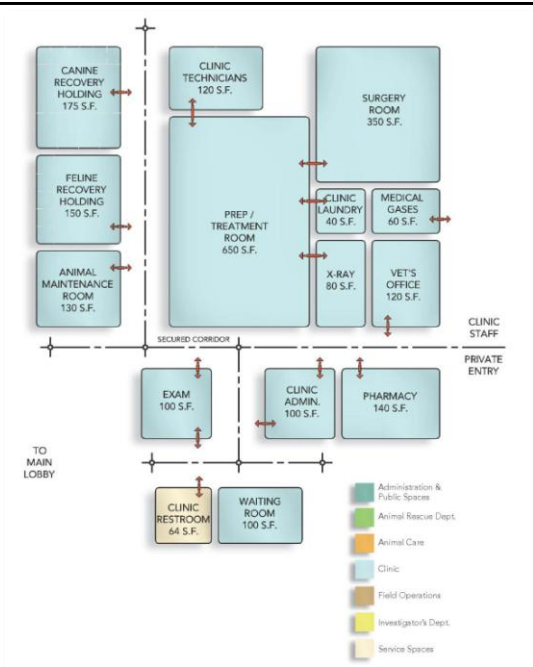


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Departmental Adjacencies

Clinical Areas

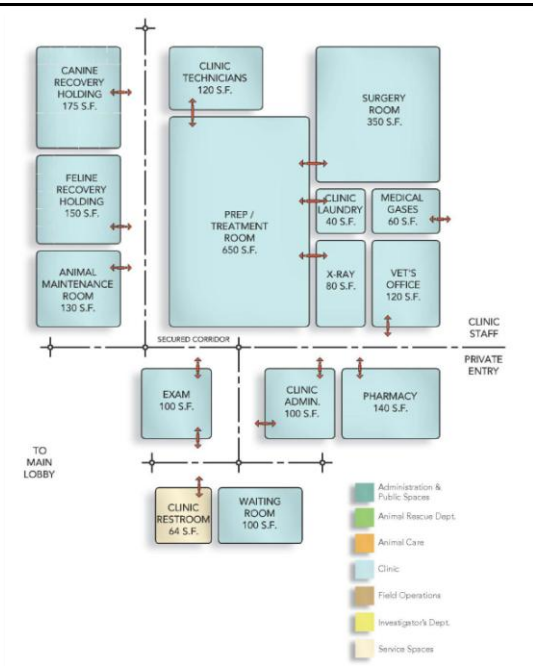


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各部門相對位置

診療區

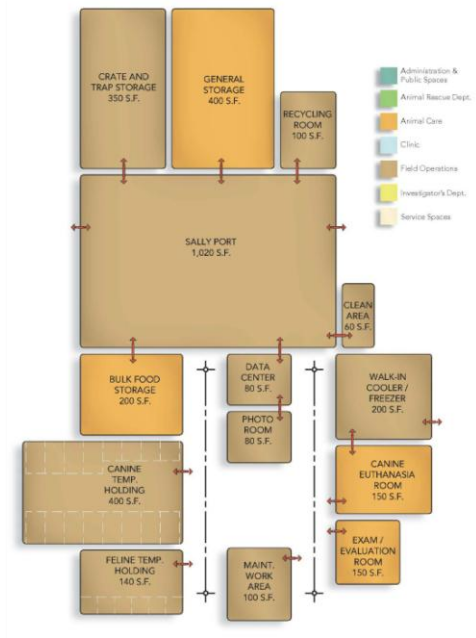


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Departmental Adjacencies

Receiving Areas

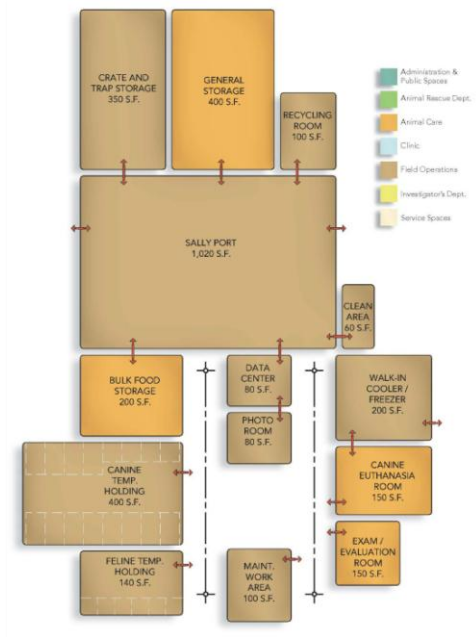


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各部門相對位置

新進動物接收區



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Composite Diagram



PRELIMINARY FLOOR PLAN
1/16" = 1'-0" scheme A

BROWARD COUNTY NEW SOUTH ANIMAL CARE FACILITY

- administration & public spaces
- animal rescue department
- animal care
- clinic
- field operations
- investigator's dept.
- service space
- circulation

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合併圖



PRELIMINARY FLOOR PLAN
1/16" = 1'-0" scheme A

BROWARD COUNTY NEW SOUTH ANIMAL CARE FACILITY

- administration & public spaces
- animal rescue department
- animal care
- clinic
- field operations
- investigator's dept.
- service space
- circulation

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SPCA of the Florida Keys



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佛羅里達的SPCA空間示意圖



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SPCA of the Florida Keys



Rendering shows additions to a metal building warehouse converted to an animal shelter.

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佛羅里達的SPCA透視示意圖



收容所由倉庫改建而成，圖示為其金屬建築物的附加部分

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Virginia Beach (Virginia) Animal Shelter



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維吉尼亞海灘(維州)動物收容所



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Virginia Beach Animal Shelter Conceptual Design



“Bird’s Eye” View



Pedestrian Perspective

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維吉尼亞海灘動物收容所 概念設計



鳥瞰圖

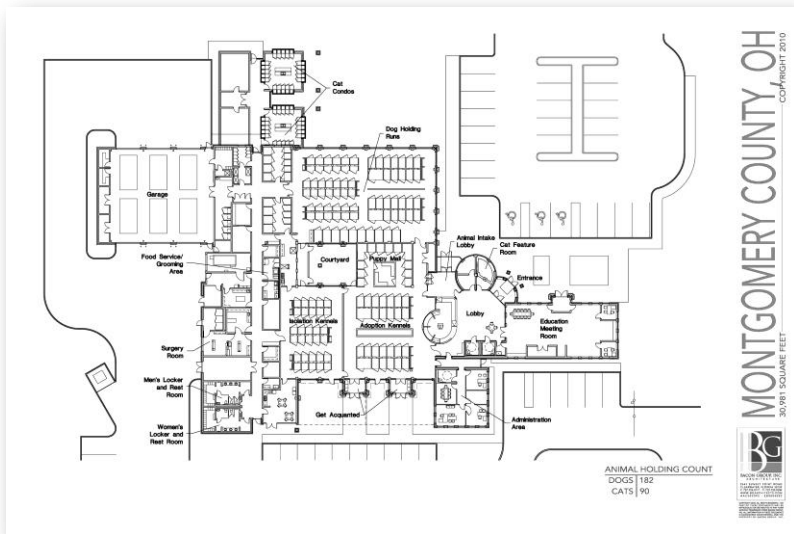


路人眼中的收容所外觀

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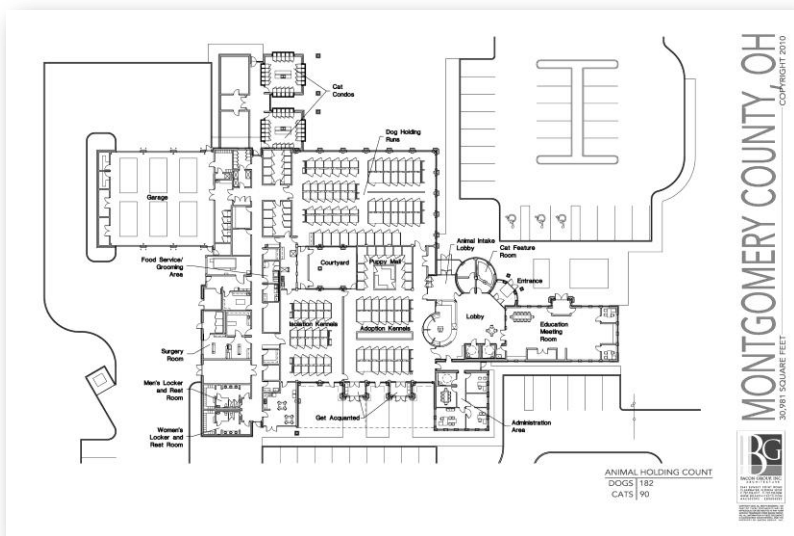
Shelter Floor Plan Design



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收容所平面圖設計



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Full Painted Rendering



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全彩圖外觀透視圖



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Montgomery County Animal Resources Center, Dayton, Ohio



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蒙哥馬利動物資源中心 俄亥俄州



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Small Shelter Floor Plan

- Animal census for housing capacity / separation
- Must have critical spaces
- Combine spaces such as
 - One common lobby
 - Food prep & food storage
 - Grooming & laundry
 - Garage & carport instead of 2-vehicle sally port
- Staffing

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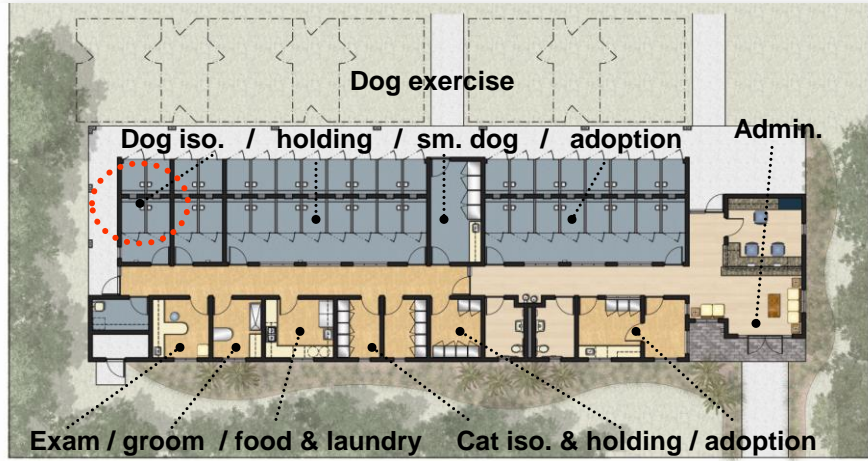
小型收容所平面圖

- 根據動物數統計估算收容量/隔間
- 必須保留關鍵區域
- 合併利用以下空間
 - 共用單一大廳
 - 食物準備及儲藏室
 - 動物美容及洗衣區
 - 車庫及車棚
- 人員分配

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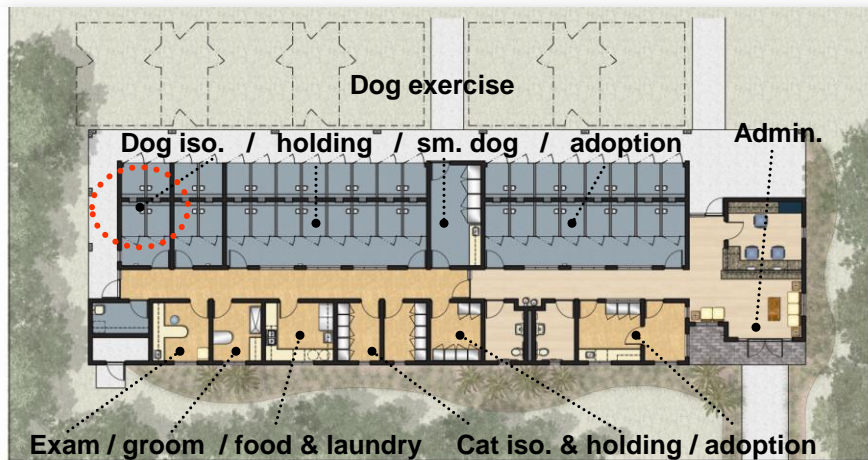
Small Shelter Floor Plan



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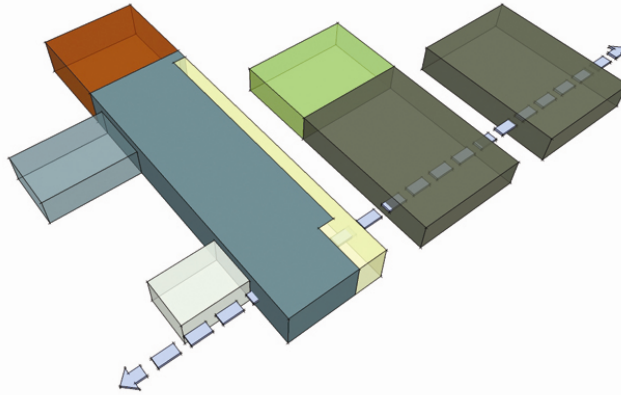
小型收容所平面圖



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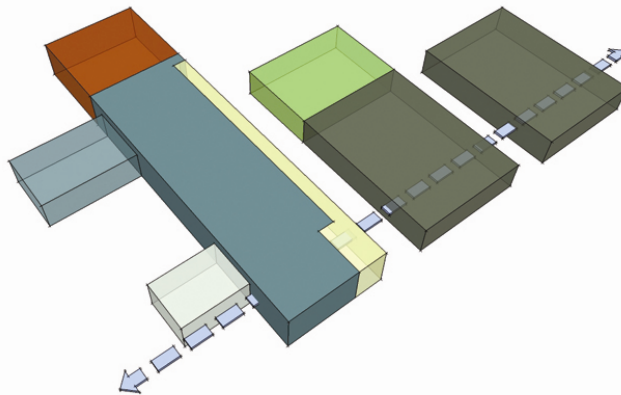
Phase Project for Expansion



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分段擴建計畫



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Anticipate expanding the shelter's capacity if you expect there will be increased demand for your services.



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因應未來可能增加的收容需求，預先考慮擴建收容所的方式



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Stand-Alone Spay / Neuter Clinic

- Similar to a veterinary hospital
- Site design & adequate parking
- Adequate waiting area
- Separate cat & dog waiting area if possible
- Adequate number of exam rooms
- Design surgery suite to handle large number of surgeries
- Disease control
- Office & support areas

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提供絕育/結紮手術的獨立診療區

- 類似獸醫院
- 地點設計及充足的停車空間
- 寬敞的候診區
- 若條件許可，貓和狗的候診區應分開
- 數量足夠的檢查室
- 設計能因應大量手術需求的手術套房
- 疾病管制
- 辦公區及其他次要區域

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Veterinary / Spay-Neuter Floor Plan



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獸醫院/結紮醫院平面圖



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Community Animal Hospital
Jacksonville (Florida) Humane Society



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社區動物醫院
傑克遜維爾（佛羅里達）人道協會

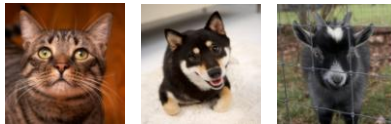


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Renovation Project Planning

- Look at your facility with a critical eye. What do others see that you have learned to ignore?
- Determine a budget.
- Consider future needs.
- Prioritize the list & tackle a few at a time.

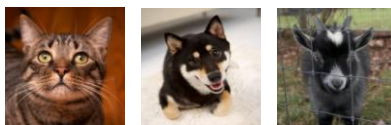


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修建規劃案

- 審慎檢視現有設施：哪些是自己習慣性忽略，但旁人認為需要改進的的缺失？
- 決定預算
- 考量未來需求
- 排定優先順序，一次處理其中幾項



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Renovation – More Costly Items

- Major reconfiguration of space involving structural elements
- New roof or building façade
- Building additions
- Major alternations to the mechanical and / or electrical systems

修建－花費較高的項目

- 空間配置的重大更動，包括結構的部分
- 新的屋頂或建築物的立面
- 建築物的增建部分
- 機械設備和/或機電系統的大幅更動

Remodeling

An architect can help with space planning when reusing an existing footprint.



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改造

建築師可重新利用原始藍圖協助空間設計



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Create a Spacious Reception

- Use different kinds of lighting
 - Natural
 - Recessed
 - Track
 - Up-lights
 - Sconces
- Colors
- Seating



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打造一個寬敞的接待區

- 利用不同的照明方式
 - 自然光
 - 嵌壁式光源
 - 活動式投射燈
 - 間接光源
 - 燈檯
- 色彩
- 座位安排



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Clean & Simple



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乾淨、簡單



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Lighten-Up the Clinic Areas

- Add a glass block wall
- Open up the surgery to view from the lobby or other public vantage.



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照亮診療區

- 增加一面玻璃牆
- 開放手術室，納入民眾從大廳等公共空間可及的視線範圍



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New or Refurbished Millwork

Quality constructed cabinets (uppers may have open shelves if you are neat)



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全新或整修過的木作設備

高品質櫥櫃（善於收納者可使用開放式層架）



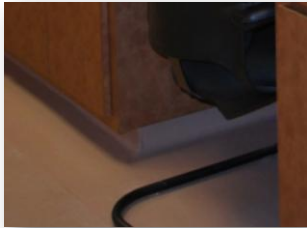
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New or Refurbished Millwork

- Location
- Wood
- Laminatesh
- Solid surface
- Raised pad



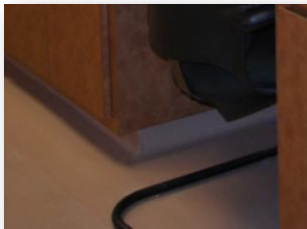
Using all white solid surface tops with new millwork saved money.

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全新或整修過的木作設備

- 位置
- 木材
- 層壓板
- 堅固檯面
- 抬高櫃底



統一採用白色檯面以節省成本

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Countertop Material



Re-cycled white marble countertops

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檯面材質



回收再製的白色大理石檯面

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Millwork Alternatives



Purchasing used stainless steel restaurant equipment saved money.

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木作設備的替代品



向餐廳收購二手不鏽鋼櫥櫃以節省成本

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Millwork Alternatives



Counters are used stainless steel restaurant equipment. Sink inserts and faucets can be replaced and new skirts can be attached to hide equipment.

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木作設備的替代品



購自餐廳的二手不鏽鋼櫥櫃，可更換水槽及水龍頭，也可安裝壁腳板來遮住下方器具

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Creating Small New Spaces

Creating adjustable height shelves between wall studs improved the efficiency of this small spay/neuter clinic.



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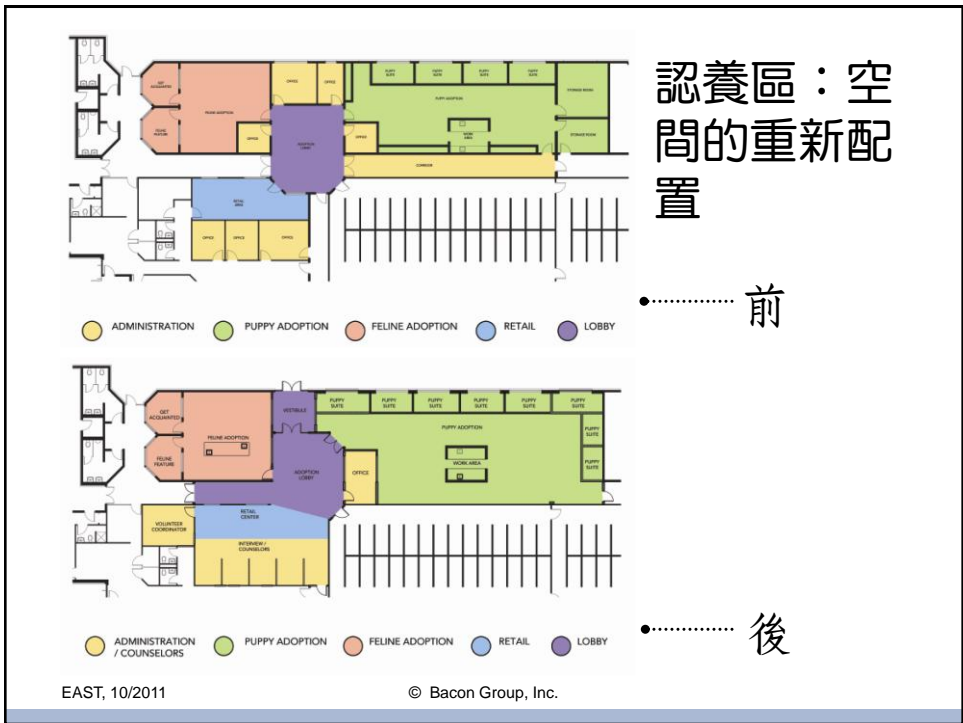
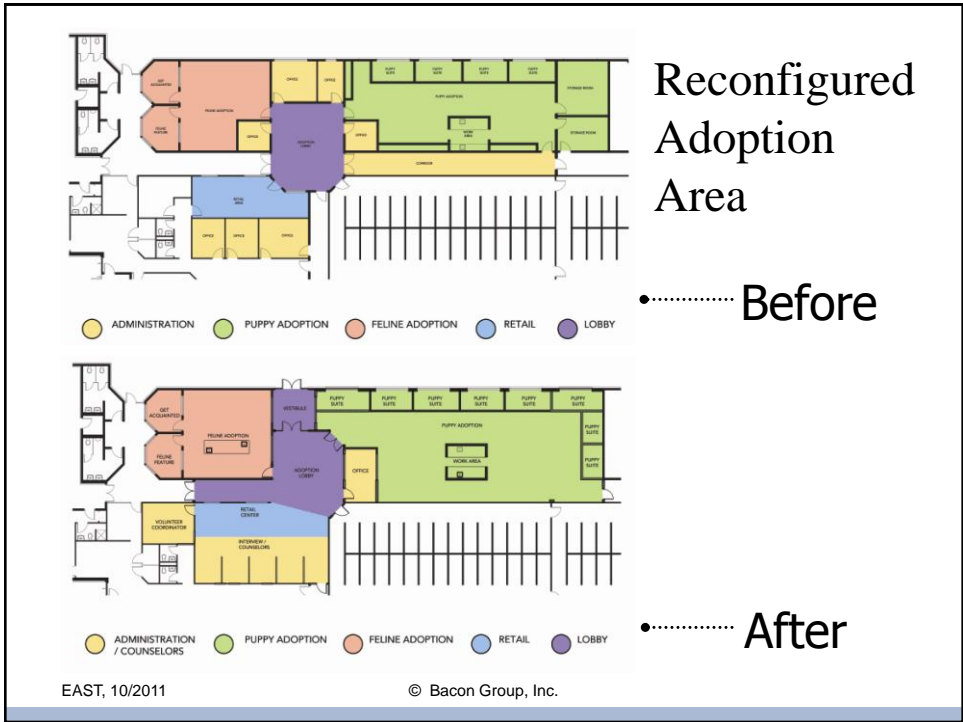
創造零碎空間

在中間柱之間創造出可調整高度的層架，提高了這間小型絕育/結紮診所的工作效率。



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Atlanta (Georgia) Humane Society



Enlarge & renovate adoption area included refinishing cages, floors, walls & cabinets.

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亞特蘭大(喬治亞州)人道協會



擴建並翻新認養區，包括重新修整籠子、地板、牆面和櫥櫃

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Atlanta Humane Society



New entrance, retail and adoption counseling cubicles

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亞特蘭大人道協會



翻新後的入口處、商品販賣區和認養諮詢室

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Before / After

PAWS of Carteret in Morehead City, North Carolina, purchased an existing building then relocated and renovated the building. They will construct new animal housing next to the renovated building.



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改造前/改造後

北卡羅萊納州加特利郡莫赫德港的PAWS買下一棟現成建築物，將它遷往他處並翻新。他們將在翻新後的建物旁增建動物居住區。



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Review

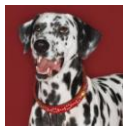
- Housing categories are specific to organization.
- Animal housing capacity will increase when holding periods are longer.
- Specify room criteria.
- Adjacencies related to disease control & staff efficiency.
- Proper flow & function are very important for animal shelters.

重點回顧

- 空間配置方式因組織而異
- 收容期若延長，動物收容量將增加
- 詳細說明個別空間需求
- 相對位置的關聯性將影響疾病控制及人員工作效率
- 適當的動線規劃及功能設計是收容所不可或缺的

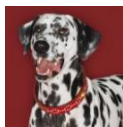
*Professional Animal Shelter
Design & Construction*

Questions & Answers



專業動物收容所設計與建築

問與答



*Professional Animal Shelter
Design & Construction*

Animal Housing and Other Spaces

Presented by

Richard S. Bacon, AIA, LEED-AP BD+C, CGC



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專業動物收容所設計與建築

動物居住區及其他空間

主講者

Richard S. Bacon, AIA, LEED-AP BD+C, CGC



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Acknowledgements

- Mason Co.
- Shor-line / T-Kennel
- Spray Master Technologies (SMT)
- Tri-star Metals

- Martha Seng, FAIA
- Steve Jensen, AIA
- Stoiber + Associates
- Thomas Johnson, AIA



感謝

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- Shor-line / T-Kennel
- Spray Master Technologies (SMT)
- Tri-star Metals

- Martha Seng, FAIA
- Steve Jensen, AIA
- Stoiber + Associates
- Thomas Johnson, AIA



Learning Objectives

- Understand different types of dog and cat housing.
- Learn how proper animal housing reduces the spread of diseases.
- Learn how housing can reduce stress in animals and provide a more humane environment.
- Identify techniques to improve all spaces for the health and well-being of the animals.

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學習目標

- 認識貓和狗的各種居住空間
- 了解適當的居住空間如何減少疾病的蔓延
- 了解居住空間如何減輕動物所受壓力，提供一個較為人道的環境
- 認識能改善所有空間以提升動物健康與福祉的方法

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Disease Control

- Fomites
- Separation of animals
- Proper design of animal housing
- Design to lessen stress
- Plumbing & drainage design
- Cleaning protocols
- Application of materials



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疾病管制

- 非生物性媒介物
- 將動物分區隔開
- 動物居住區的適當設計
- 減輕壓力的設計
- 水電工程及排水設計
- 清掃準則
- 建材應用



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Cost Comparison

Example: 3 foot wide kennel gate

- Chain link \$200
- Galvanized \$350
- Stainless Steel \$500



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成本比較

例如：三呎寬的籠舍門

- 鐵網 \$200
- 鍍鋅鐵網 \$350
- 不鏽鋼 \$500



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Dog Adoption Kennels



Inside view



Public view

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認養區狗舍



內部景象



外觀

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Dog Adoption Housing



Kennel above has an elevated floor which is a rubber-coated grate.



Dog rooms above have glass fronts that reduce noise in the kennel. Each room is ventilated. Notice the elevated dog beds; each room has a covered trench drain.

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認養區居住空間



籠舍中墊高的地板是覆蓋著橡膠的格柵。



房間前側的玻璃可以降低犬舍中的噪音。每個房間都裝了通風設備。注意狗床是墊高的。每間房裡都有一道附蓋排水溝。

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Dog Housing

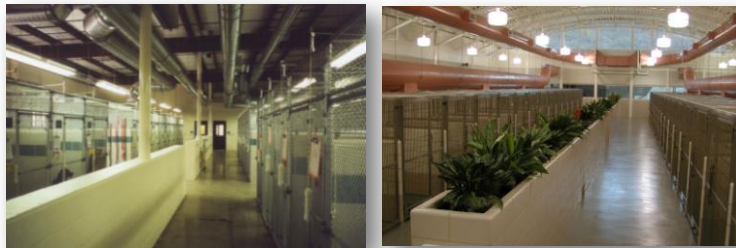


Notice the divider wall between kennels so the dogs do not face each other. This configuration helps reduce stress in the dogs, but it does require more circulation space.

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狗舍



注意：籠舍之間的隔間牆可阻擋狗的視線，讓他們看不到對方。這設計有助於減輕動物壓力，但的確需要較大的流通空間。

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Dog Kennels

- Double-sided kennel with guillotine door
- Move dog to other side of kennel during cleaning
- Sloped floor and resinous flooring
- Covered trench drain
- Water and food bowl in door

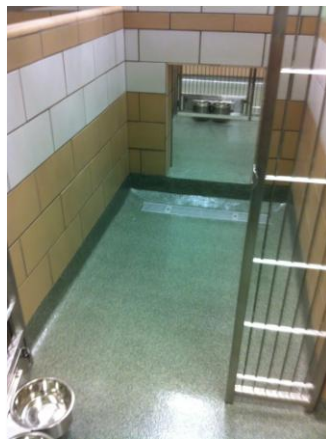


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狗舍

- 中有閘門且雙側可開的狗舍
- 打掃其中一側時，可讓狗到另一側活動
- 有坡度的樹脂地面
- 附蓋排水溝
- 籠舍內有水盆和食盆



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Dog Feature Room

This kind of room is used to feature a dog for adoption. It has an elevated bed and a small kennel for privacy.

Use elevated beds or resting platforms in regular kennels to help dogs avoid water and waste.



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展示間

這類房間是用來展示供民眾認養的狗。備有一張墊高的床，和一個讓狗享有一點隱私的小籠子。

一般狗舍內也應有墊高的床或休憩平台，以免狗踩到水或糞物。



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Puppy Adoption Kennels



Inside view



Public view

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幼犬認養區籠舍



內部景象



外觀

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Small Dog & Puppy Adoption



Notice the service counter in the middle of the room in the photo on the upper left.

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小型犬和幼犬認養區



注意左上圖中位於房間中央的服務台。

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Puppy Adoption Room



Notice the large windows that let you see inside the puppy room from the lobby in the photo on the upper left.

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幼犬認養室



注意左圖中的大面窗戶：訪客從大廳就能看到幼犬室內部。

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Dog Get Acquainted



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讓狗跟有意認養者互動



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Dog Kennels



Kennels above are epoxy painted block with high quality, galvanized caging. Notice the kennels are enclosed on the top and the food bowls at the bottom.



Kennels above have stainless steel fronts and divider panels between each kennel. The tops are not enclosed.

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犬舍



圖中籠舍採用了塗以環氧樹脂的壁板和高級鍍鋅鐵網。注意籠舍上方的鐵網和下方的食盆。



籠門為不鏽鋼材質，籠舍之間有隔間板，上方無蓋。

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Dog Kennels & Cages



Kennel in the photo above has a privacy panel for the dogs. Notice the split kennel door and the guillotine door and trench drain in the kennel on the right.



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籠舍



上圖中的犬舍裝了一面讓狗能保有隱私的牆板。注意右圖中的犬舍門是上下分離活動式的，犬舍內有閘門和排水溝。



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Modular Kennels & Cages



Photo above left shows pre-fabricated, modular kennel. Kennels in both photos have raised floors. Photo on the right shows one way to design drainage for modular kennel cages.

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組合式籠舍



左上圖中為預鑄式組合籠舍。兩張圖中的籠舍地板都是墊高離地的。圖右所示為組合式籠舍排水設計的一種。

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Bank of Cages on a Raised Pad



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墊高地面上的成排籠子



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Small Aluminum and Fiberglass Cages



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材質為鋁和玻璃纖維的小型籠子



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Cats



Univ. of Cal. at Davis Shelter Medicine program recommends

- 11 square feet (slightly less than 1 square meter) of floor area per singly housed cat
- Large enough for a full body length stretch
- Separation of feeding, resting, eliminating
- Litter box large enough for the cat
- Sufficient floor space for locomotion and play

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貓



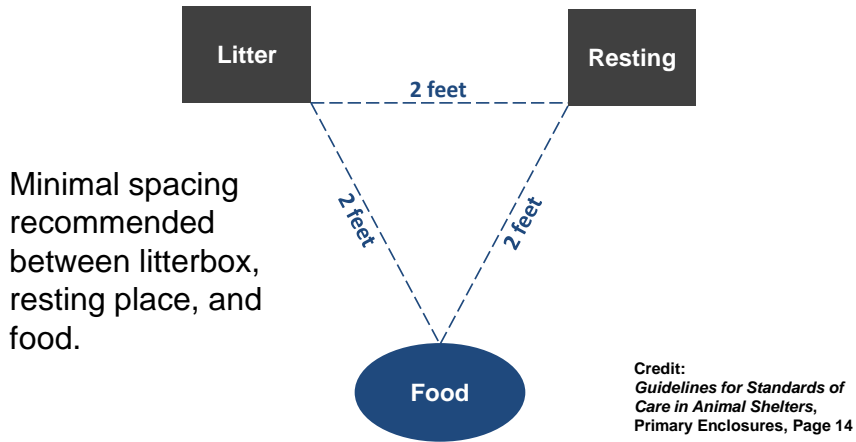
加州大學戴維斯分校收容獸醫計畫提出以下建議：

- 每隻獨居的貓應有11平方英尺（略小於1平方公尺）的平面空間
- 有足夠空間讓貓充分伸展至身體全長
- 區分餵食、休憩與排泄區
- 準備大小適中的貓砂盆
- 應有充分地面空間供其運動和玩耍

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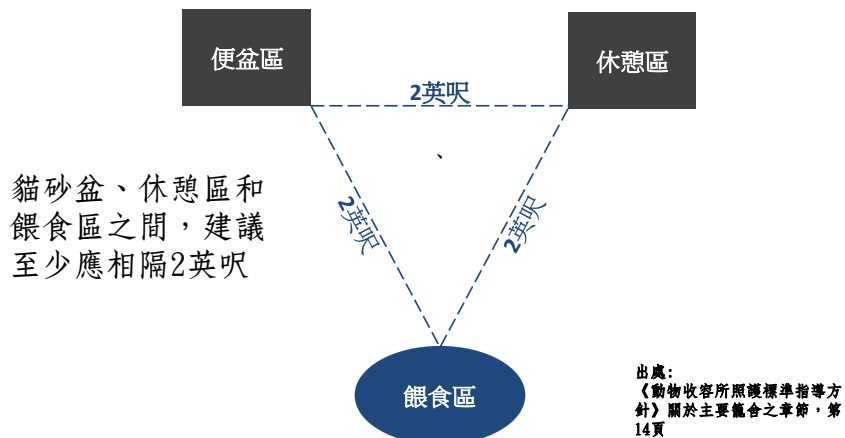
Cat Housing Spacing



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貓舍空間規劃



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Cat Housing



Pictured above are “cat malls”. The staff works inside and visitors can see the cats through plexi-glass from the outside.

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貓舍



圖中為「貓咪廣場」。人員在內部工作，訪客則可透過塑膠玻璃觀察這些貓。

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Cat Housing



Mason Company Cat Condo



Design response to new cat housing recommendations

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貓舍



梅森公司出品的貓公寓



因應新的貓舍空間規劃建議而修正設計

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Cat Housing



Cat housing with socialization area.
All cats must be healthy.

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貓舍



規畫了社交區域的貓舍。
必須確保所有的貓都很健康。

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Cat Housing



This cat enclosure is designed to hold cats while they are being assessed. Each enclosure has a roll-up door that can be opened to allow the cats access to fresh air and sunshine and closed during cold weather. Notice the wall perches so the cats may climb up high. This facility is located in a moderate climate.

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貓舍



這間貓舍是設計來容納正在接受評估的貓。每間都有一道可上捲的門，打開後可引進新鮮空氣和陽光，天冷時可關上防寒。留意牆上裝了休憩平台，讓貓可以爬到高處。收容所位於氣候溫和的地區。

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Free-Roaming and Feature Cat Housing



Group cat housing should provide ample space for litter boxes and feeding stations. Include hiding and resting spaces and enrichment activities. Do not over-crowd.

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可讓貓自由活動的展示用貓舍



群居貓舍應有充分空間容納貓砂盆及餵食站。設計中應包括藏身處、休憩空間，也要提供使居住環境豐富化的各種活動。控制貓的數量，避免過度擁擠。

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Cat Group Housing



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群居貓舍



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Cat Housing

Photo shows cat housing made from Corian solid surface material.

This custom built cat cage is very expensive but it is well ventilated and is easy to clean because of its seamless design.



Credit Washington Animal Rescue League
Washington, D.C.
Stoiber Architects

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貓舍

圖中的貓舍材質是杜邦可麗耐®人造石。

這種定製的貓舍造價雖高但通風良好，無縫設計使它便於清理。



感謝位於華盛頓的華盛頓動物救援聯盟提供照片
Stoiber建築師事務所

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Lobby and Reception



These generously sized lobbies are public-friendly and free of animal odors and noise.

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大廳及接待處



這些寬敞的大廳裡沒有動物的氣味和噪音，民眾樂於來訪。

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Lobby and Reception



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大廳及接待處



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Simple Lobby



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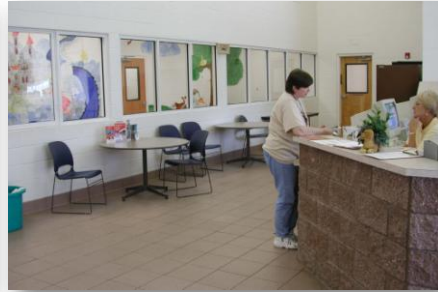
設計簡單的大廳



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Lobby and Reception

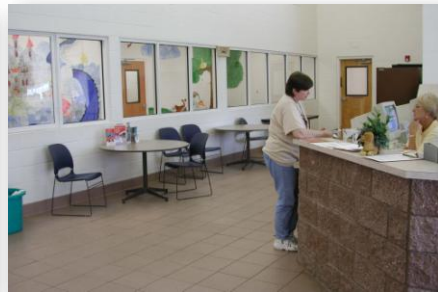


Visitors can view animals for adoption from the lobby.

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大廳及接待處



訪客從大廳就看得得到待認養的動物。

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Public Areas



Surrender

- Lobby
- Get acquainted
- Humane education
- Interactive exhibits
- Children's activities



Get acquainted



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公共區域



辦理飼主棄養手續的地方

- 大廳
- 人狗互動、熟悉彼此
- 人道教育（動物福利教育）
- 互動式展示區
- 讓小朋友參與活動



人狗互動區



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Retail Sales



At this SPCA the retail sales and gift shop is located next to the adoption counseling area to maximize sales

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零售營業部



為了提高銷量，這間SPCA收容中心的禮品販賣部就設在認養諮詢區隔壁。

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Training / Meeting Space



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人員訓練/會議室



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Treatment & Surgery Areas

- Pre – op room
- Surgery room
- Post & pre-op holding
- Vet area
- Secure drug storage



- Direct view from surgery to recovery
- Seamless flooring
- Exhaust vent for gases

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治療及手術區

- 術前準備室
- 手術室
- 術前及術後觀察室
- 獸醫工作區
- 安全的藥品儲藏室



- 從手術室可以直接看到恢復室
- 無縫地面
- 氣體的出風口

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Treatment & Surgery Areas



These areas make good use of natural light and have cleanable surfaces.



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治療及手術區



善用自然光源，並採用易清理的表面材質。



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Treatment & Surgery Areas



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治療及手術區



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Treatment & Surgery Areas



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治療及手術區



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Staff Areas are Necessary Spaces

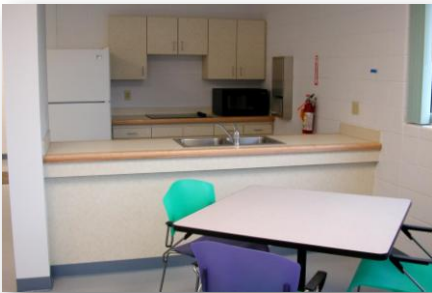


Break rooms, training rooms, locker & rest rooms provide needed respite areas for shelter staff.

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員工活動區是不可或缺的



休息室、員工訓練室、置物櫃和洗手間，提供工作人員需要的休憩空間。

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Animal Support Areas



Food Prep

Support areas like laundry, grooming, food storage and food prep are designed to minimize walking distances and maximize efficiency.

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動物支援區



食物準備室

洗衣間、美容室、食物儲藏室及食物準備室等支援區域，設計規劃的要點在於盡量縮短步行距離、提高工作效率。

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Animal Support Areas



Grooming

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動物支援區



美容室

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Laundry – Commercial vs. Residential

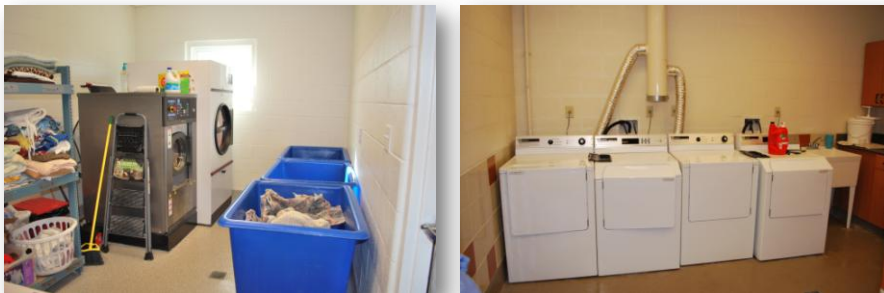


Commercial equipment requires more floor clearance area.

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洗衣間：營業用 vs. 住宅用



營業用設備需要更大的淨空地面。

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Sally Port



Make sure the sally port is a secured area for the off-loading of animals.



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車庫



確保此區可安全卸載動物。



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Training / Exercise



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訓練/運動



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Enrichment



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豐富化的環境



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Social & Entertainment



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社交與娛樂



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Gloucester-Mathews Humane Society
Gloucester, Virginia



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格洛斯特－馬修人道協會
維州格洛斯特郡



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In-door / out-door kennels above and outdoor exercise area below.



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上圖為兼具室內/戶外區域的狗舍，下圖為戶外運動區。



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Gift Shop

The lobby below is large enough for special events.



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禮品店

大廳有足夠空間舉辦特殊活動。



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The dog and cat adoption features can be viewed from the lobby.

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從大廳就可以看到待認養貓狗展示區。

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Dogs & Puppies



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成犬與幼犬



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**Cat
Areas**



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貓舍



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Staff area



Screened cat lanai



Fenced exercise



Pet Waste station on exercise trail

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員工活動區



裝有紗窗、供貓使用的曬台



圍籬內為運動區



運動步道上的寵物糞便清理站

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Storage



Outside grooming tub



Exam / treatment



Grooming

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儲藏室



室外美容澡盆/區



診療室



美容區

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Donors' names are engraved on bricks



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贊助人的名字就刻在石磚上



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Creative Ideas



(Stoiber+ Assoc., Washington ARL)

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創新構想



(Stoiber建築師事務所)

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Creative Ideas



Y-shaped barriers function as noise baffle, vision barrier between kennels , shade structure, and solar panels.

(Martha Seng, AIA, Arizona Humane Society)

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創新構想



多功能的Y型隔板可隔音、阻絕視線、提供陰影，同時也是太陽能電池板

(Martha Seng, AIA, Arizona Humane Society)

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Creative Ideas



Cat feature structures require careful cleaning and maintenance. (Berkshire Humane Society)

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創新構想



貓舍中的特殊結構需要仔細清理保養（波克夏人道協會）

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Creative Ideas



Shaped, painted millwork for reception counter and retail display structure create visual impact in the lobby.

(Martha Seng, FAIA, Humane Society of So. Mississippi)

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創新構想



大廳裡的接待櫃台和零售商品展示櫃都設計成彩色動物造型，營造視覺效果。

(Martha Seng, FAIA, 密西西比人道協會)

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Creative Ideas



Restaurant style booths for private adoption counseling.

(Martha Seng, FAIA, Houston SPCA)

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創新構想



猶如身在主題餐廳：火車座般的認養諮詢室

(Martha Seng, FAIA, 休士頓 SPCA)

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Creative Ideas



Charleston, South Carolina, Rainbow Row inspired cat townhouses (upper right)

(Steve Jensen, AIA, MSPCA Nevins Farm)

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創新構想



南加州查爾斯敦的彩虹街激發了建築師的靈感，設計出貓鎮中的彩色透天層(右上圖)

(Steve Jensen, AIA, MSPCA Nevins Farm)

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Creative Ideas



Cat (& rabbit) shielded resting bench.

(Tom Johnson, AIA, & Snyder Cages)

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創新構想



附罩的貓(兔)休憩架

(Tom Johnson, AIA, & Snyder Cages)

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Creative Ideas



Dog head bracket supports entrance canopy.
(Montgomery County Animal Resource Center)

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創新構想



狗頭形狀的托架支撐著入口處的天蓬
(蒙哥馬利動物資源中心)

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Virtual Shelter Tours

- Montgomery County Animal Resource Center in Dayton, Ohio
<http://www.mcoho.org/services/arc/tour/index.cfm>
- Oregon Humane Society in Portland, Oregon
<http://www.emilive.com/portals/101/tour/1810/0.html>
- Pasco County Animal Services in Land O'Lakes, Florida
http://portal.pascocountyfl.net/portal/server.pt/community/animal_services/223

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收容所虛擬導覽 (見講義)

- 位於俄亥俄州代頓市的蒙哥馬利動物資源中心
<http://www.mcoho.org/services/arc/tour/index.cfm>
- 位於奧勒岡州波特蘭市的奧勒岡人道協會
<http://www.emilive.com/portals/101/tour/1810/0.html>
- 位於佛羅里達州Land O' Lakes區的帕斯科郡動物服務中心
http://portal.pascocountyfl.net/portal/server.pt/community/animal_services/223

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Review

- What are characteristics of desirable types of dog and cat housing?
- How can animal housing reduce the spread of diseases?
- What design features provide a more humane environment?

重點回顧

- 理想的貓狗籠舍有哪些特點？
- 動物籠舍如何能減少疾病散布？
- 哪些設計要點能提供一個較為人道的環境？

*Professional Animal Shelter
Design & Construction*

Questions & Answers



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專業動物收容所設計與建築

問與答



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*Professional Animal Shelter
Design & Construction*

Materials, Plumbing, HVAC

Presented by

Richard S. Bacon, AIA, LEED-AP BD+C, CGC



專業動物收容所設計與建築

材料、水電與暖通空調

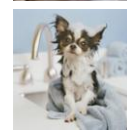
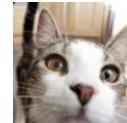
主講者

Richard S. Bacon, AIA, LEED-AP BD+C, CGC



Learning Objectives

- Understand material cost and location vs. quality vs. maintenance.
- Understand which materials to use.
- Understand proper plumbing and HVAC systems for animal shelters.
- Understand how design effects energy efficiency.

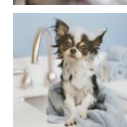
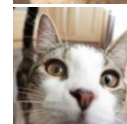


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學習目標

- 瞭解材料的成本、安置、品質與維修
- 應該使用哪種材料
- 適當的水電和暖通空調
- 設計如何影響能源效益



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Materials

- Floors – resinous, sealed concrete, tile
- Kennel walls – glazed block, epoxy painted block
- Millwork construction
 - Solid surface tops
 - Open cabinets or cabinet doors on upper cabinets
 - Raised base
 - Marine grade plywood in wet areas
 - Stainless steel restaurant equipment

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材料

- 地板：樹脂、水泥與磁磚
- 牆面：光面與塗脂砌塊
- 系統櫥櫃
 - 堅固面板
 - 上層櫥櫃採開放式或有門板的設計
 - 墊高
 - 潮濕區域使用航海級合板
 - 不鏽鋼餐廳設備

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Materials Effect Disease Control

- Fomites
- People / animal circulation
- Separation of animals
- Design to lessen stress
- Zoned / compartmentalized HVAC
- Fresh air in-take, re-circulation, & filtering
- Plumbing & drainage design
- Cleaning protocols

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材料影響疾病控制

- 非生物傳染媒介
- 人與動物之間的交互傳染的
- 隔離動物
- 減少緊迫的設計
- 分區的暖通空調
- 新鮮空氣、再循環及過濾
- 水電與排水設計
- 清掃方式

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Most Costly Systems / Finishes

- HVAC system
- Plumbing system
- Kenneling and caging systems
- Interior floor and wall finishes
- Roof structure and finishes
- Exterior wall finishes

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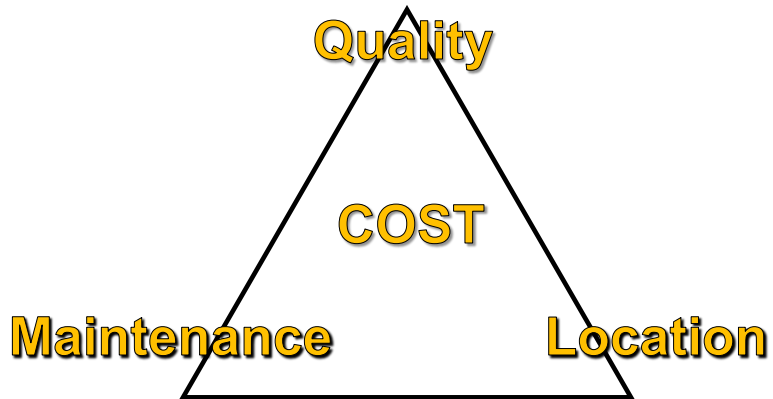
最貴的系統與粉刷收尾

- 暖通空調系統
- 水電系統
- 欄舍或籠舍模組
- 內部地板與牆面塗裝
- 屋頂結構與塗裝
- 外牆塗裝

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Cost Triangle

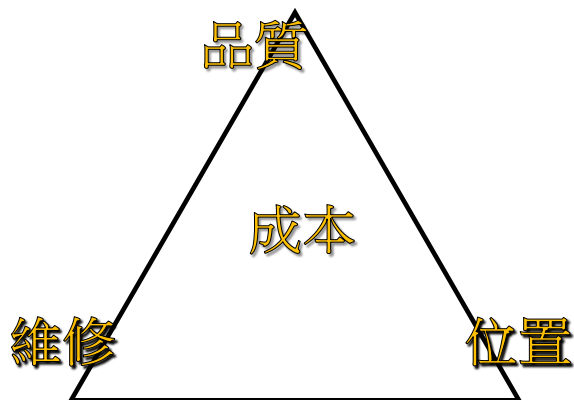


Consider these variables and purchase the best quality materials you can afford.

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成本三角



考量這些因素，購買付得起的最佳材料

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Wood & Metal in Shelters



Wood and metal are not compatible with the wet environment of an animal shelter.



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木料與金屬



木料與金屬並不適用於收容所的潮濕環境。



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Wood & Metal in Shelters



Damage was caused by a pit bull dog.

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木料與金屬

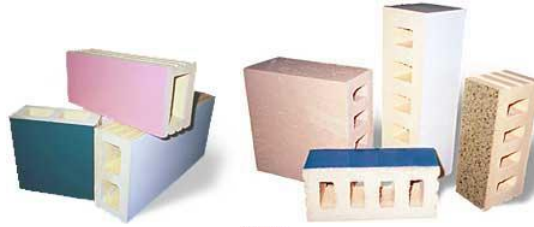


一隻鬥牛犬造成的損壞

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Wall Materials



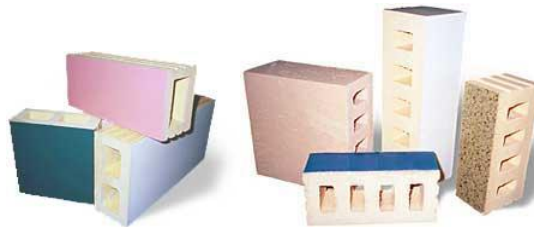
Wood



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牆面材料



Wood



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Wall Materials: Block and Brick

- Very durable, low maintenance
- Less joints than tile
- Prefer over coated concrete block
- Many shapes, sizes, colors
- Installed by experienced mason



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砌塊或磚塊

- 耐用、容易維護
- 接縫比磁磚少
- 比有護膜的水泥磚更好
- 形狀、尺寸、顏色多樣
- 有經驗的施工者

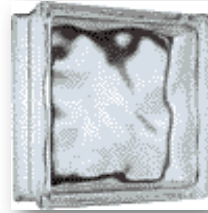


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Wall Materials: Glass Block

- Provides tempered strength with ready observation
- Alleviates jail look
- Emits light and provides privacy
- Requires more cleaning
- Available in white glass

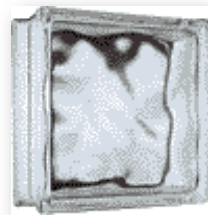


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玻璃磚

- 經強化且便於觀察
- 去除「監獄」形象
- 反射光線但提供隱密性
- 需要更多清潔
- 白玻璃



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Glass Block in Surgery



Glass block is a good way to bring light into a room.

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手術室採用玻璃磚



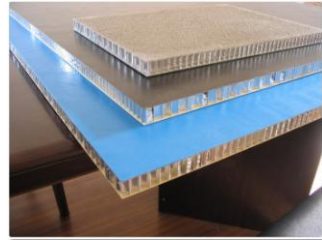
有助於室內採光

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Wall Materials: Fiberglass Wall Board

- Virtually indestructible fiberglass reinforced plastic (FRP) panel
- Wainscoting in food prep/storage, grooming, laundry
- Joint design
- Seams need extra sealing efforts
- Size 4' x 8' & 4' x 12', limited colors

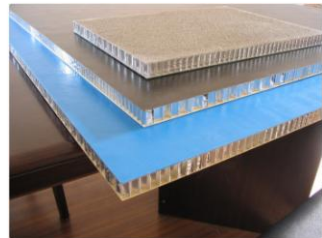


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玻璃纖維板

- 不易破壞
- 適合廚房、食物儲藏室、美容室或洗衣區
- 接合設計
- 接縫處需要加強
- 兩種尺寸4' x 8' & 4' x 12'、顏色有限



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Flooring Materials

- Tiles
- Resinous (seamless)
- Vinyl composition tile (VCT)
- Sheet vinyl (linoleum)
- Concrete tile (VCT)



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地板材料

- 磁磚
- 樹脂(無縫)
- 乙烯基合成磚 (VCT)
- 乙烯基布料 (漆布)
- 水泥



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Tile Types

- Porcelain
 - Durable for high traffic areas
 - Color throughout
- Quarry tile
- Ceramic tile
- Finishes & sizes
- Grouts



Tile over plywood substrate

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磁磚種類

- 瓷磚
 - 耐用
 - 色澤耐磨
- 石板
- 陶質
- 塗裝及尺寸
- 薄膠泥



膠合板層上覆磁磚

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Grouts

- Material that fills joints
- Epoxy, stain-resistant are best in all locations except restrooms
- Seal grouts
- Darker colors show less



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薄膠泥

- 接縫使用
- 除廁所外，Epoxy 最好用
- 密封膠
- 暗色較不易髒



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Vinyl Composition Tile (VCT)

- Good, all-around material.
- Make sure comfortable with location.
- Regular cleaning helps clear joints of dirt
- Designer colors and patterns
- Rubber tile similar: not as durable and more costly

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乙烯基合成磚 (VCT)

- 用途廣泛的好材料
- 位置需適當
- 常清潔去灰塵
- 顏色與形式
- 橡膠材質：較貴，且較不耐用

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Example of VCT Use

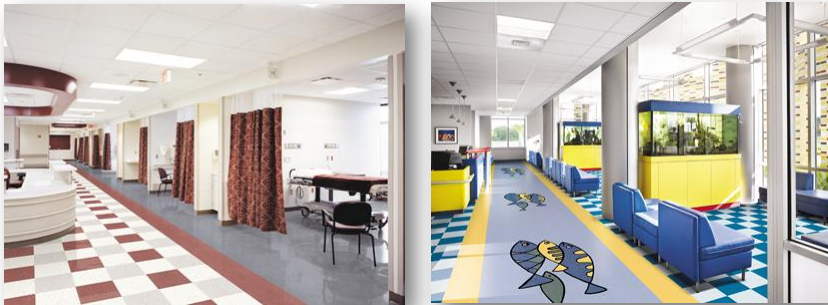


Credit: Tarkett

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VCT應用範例



Credit: Tarkett

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Sheet Vinyl

- Seams chemically or heat
- “Flashed” cove base, coves weak at corner
- Commercial, hospital grade
- Stain resistant, slip resistant grit

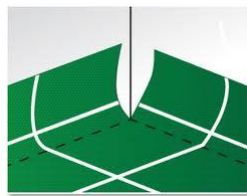


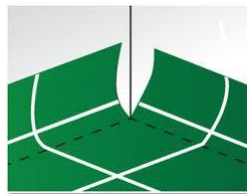
Illustration of how the corner is trimmed.

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乙烯基布料(漆布)

- 接縫用化學或熱熔膠
- 接角處比較脆弱
- 商業或醫院級
- 抗污防滑的磨砂表面



修整接角處的方式

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Sheet Vinyl Installation



Forbo Vinyl Products

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乙烯基布料(漆布) 施作



Forbo Vinyl Products

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Resinous Flooring

- Experienced installer
- Wet areas, animal housing, food handling areas
- Cove formed up wall
- Quality Assurance / Quality Control (QA / QC)
- Anti-microbial additive



Troweled-on surface



Old and chipped resinous floor

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樹脂地面

- 有經驗的工人
- 潮濕區域、動物欄舍及食物處理區
- 與牆面接合處
- Quality Assurance / Quality Control (QA/QC)
- 抗菌添加物



Troweled-on surface



Old and chipped resinous floor

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Paints & Coatings

- Surface preparation is critical
- Concrete block filler needed when painting concrete masonry units
- Epoxy paint more durable than regular enamel, two-part epoxy is best
- Elastomeric coating



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油漆與塗料

- 表面處理很重要
- 水泥石砌處須使用水泥填土
- 樹脂漆比一般的琺瑯更耐久
- 合成橡膠塗料



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Ceilings

- Painted drywall
- Acoustical plaster
- Suspended acoustical ceiling system



Paw print, acoustic lay-in ceiling system

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天花板

- 上漆但不塗泥灰的石牆
- 吸音石棉灰泥
- 懸吊吸音系統



Paw print, acoustic lay-in ceiling system

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Suspended Acoustical Tile

- Smaller 2' x 2' size nice for public areas
- Vinyl faced, good for high moisture areas like grooming,
- Other options are Mylar faced, foil wrapped or ceramic bonded
- Good acoustical & cleaning properties

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懸吊吸音磚

- 公共區域使用小尺寸較佳（2 x 2 尺）
- 在高濕度區域（美容室、犬舍），使用乙烯披覆材質
- 其他選擇：Mylar 聚脂薄膜披覆，金屬膜披覆及陶瓷披覆
- 良好的吸音與清潔特性

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Noise is a Major Source of Stress

The National Institute for Occupational Safety and Health (NIOSH) estimates that 30 million workers in the U.S. are exposed to hazardous noise.



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噪音是主要的緊迫源

美國約有3000萬工人暴露在有害的噪音環境中。(NIOSH)



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Noise in Animal Shelters

Sound levels in animal shelters regularly exceed 100 dB. Noise is a physical stressor on animals that can lead to behavioral, physiological, and anatomical responses. There are currently no policies regulating noise levels in dog kennels.

Because of its unpredictable and uncontrollable nature, the shelter is a stressful environment for a dog, and any stress-inducing stimuli that can be reduced or eliminated should be addressed if possible.

**Noise in the Animal Shelter Environment:
Building Design and the Effects of Daily Noise Exposure**
Crista L. Coppola, Animal Behavior Center, ASPCA
Urbana, Illinois
R. Mark Enns and Temple Grandin Animal Sciences Department
Colorado State University
JOURNAL OF APPLIED ANIMAL WELFARE SCIENCE, 9(1), 1-7

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收容所裡的噪音

動物收容所音量往往超過100分貝。噪音是造成動物行為、生理和功能反應的物理性緊迫源。然而，目前沒有任何關於犬舍噪音量的規範。

基於本質上的無法預測和控制，收容所對狗而言是充滿緊迫的環境。任何可能造成緊迫的刺激源，都應儘可能予以減少或消除。

**Noise in the Animal Shelter Environment:
Building Design and the Effects of Daily Noise Exposure**
Crista L. Coppola, Animal Behavior Center, ASPCA
Urbana, Illinois
R. Mark Enns and Temple Grandin Animal Sciences Department
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JOURNAL OF APPLIED ANIMAL WELFARE SCIENCE, 9(1), 1-7

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Acoustic Materials

- SoundStop by Knight-Celotex
- Products like QuietRock, by Quiet Solution
- Acoustic deck
- Acoustic plasters like Pyrok
- Acoustical suspended ceilings
- Sound absorbing wall panels

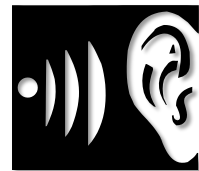


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吸音材料

- SoundStop by Knight-Celotex(產品名)
- QuietRock, by Quiet Solution 之類的產品
- 吸音板
- Pyrok 之類的吸音石棉灰泥
- 懸吊式天花板
- 吸音牆

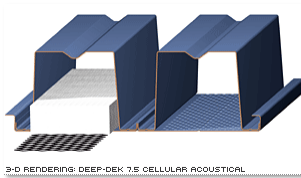


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Acoustic Decks

- Used in lieu of standard deck if metal deck is planned as part of structural system
- Specify plastic wrapped insulation
- Manufacturers fabricate decking

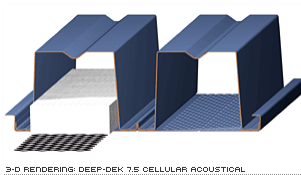


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吸音板

- 若金屬板已經是結構設計的一部份，可用吸音板代替一般金屬板。
- 指定塑膠包覆的隔音材料
- 組合式隔音結構



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Acoustic Plaster

- Product available for high moisture areas
- Substrate material and wall preparation are important
- Textures and colors available



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吸音石棉灰泥

- 用於高濕度地區
- 底料及牆面施作很重要
- 有不同質地和顏色

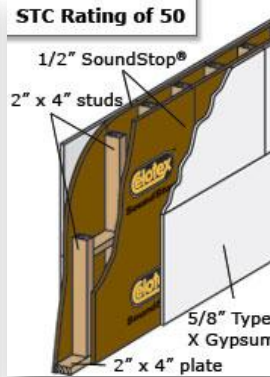


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Acoustic Material Installation

Acoustic plaster applied to walls in kennel area



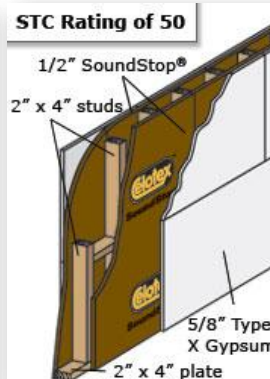
SoundStop fiberboard installation.

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吸音材料施作

犬舎内牆使用隔音膏



纖維板施作

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Acoustic Plaster in Kennel



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犬舍中的吸音石棉灰泥



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The Great Debate

- Individual round drains vs. trench drains
- Recommend avoiding open continuous trench



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爭議不小

- 個別排水或溝渠排水
- 避免開放式連續溝渠



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Floor Drain Systems

- Flushing floor drains
- Trench drains
- Individual drains
- Drain covers
 - stainless preferred



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地面排水系統

- 抽水沖洗式排水溝
- 溝渠排水
- 各別排水
- 排水溝蓋（不鏽鋼較佳）



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Flushing Trench Drains



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抽水沖洗式溝渠



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Kennel Drainage with Chase



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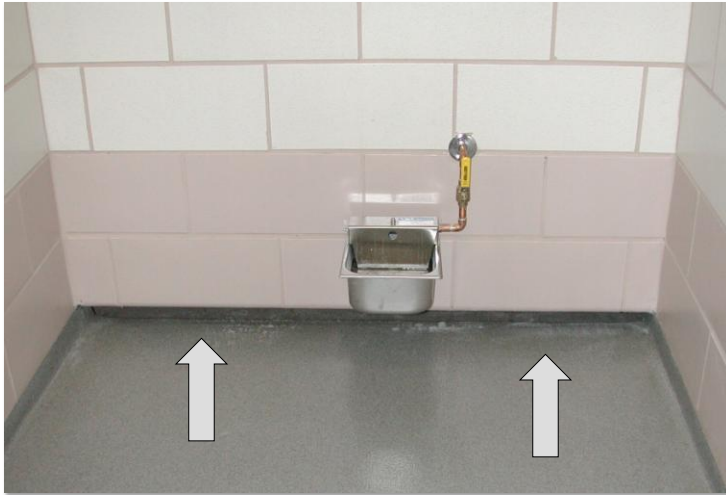
犬舍內的排水管線



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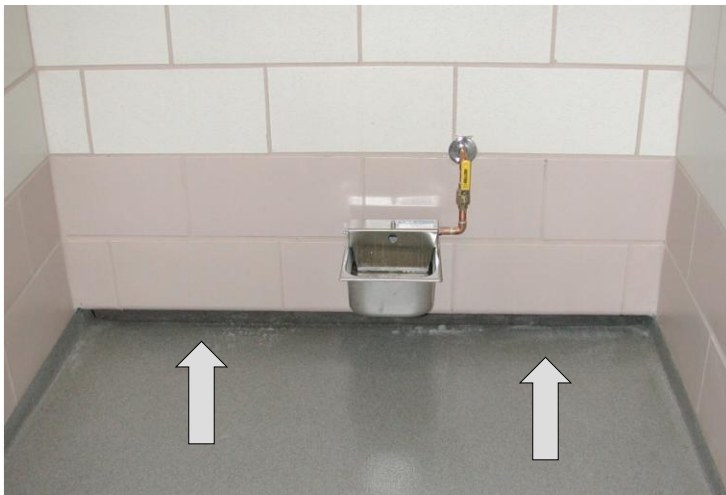
Floor Slopes to Back of Kennel



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斜面傾向犬舎後方



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Kennels drain to common chase



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犬舍排水到主管線



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Drains in Cat Areas



Sweep-up food and cat litter from floors so it does not enter floor drains and central vacuum systems.

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貓舍排水



食物碎屑與貓糞需先清理，以免進入排水與中央處理系統

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Plumbing & Drainage



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供水與排水



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Automatic Watering System



Watering system installed after construction.



Supply lines for automatic waterers are vulnerable to damage from dogs. Photo above shows a guard that was installed over the copper pipe.

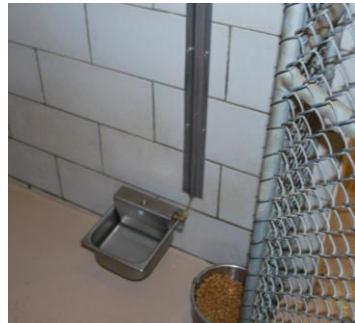
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自動給水系統



主體完工後裝設給水系統



自動給水管線易遭犬隻破壞。上圖顯示給水銅管上加裝了金屬護罩。

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Fire & Life Safety



Fire sprinkler systems in animal shelters are recommended and sometimes required by building code in the U.S.

Have a fire emergency plan and practice it with your staff. Loss of animal life from a fire is a devastating community experience.

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火災與生命安全



建議裝設火災灑水系統。

火災應變計畫需備便，並全員演練。因火災而導致犬隻死亡將是難以抹滅的社會印象。

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Water Storage Tank



On-site water store for the fire sprinkler system was required for this boarding facility that was not located near a fire hydrant.

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儲水槽

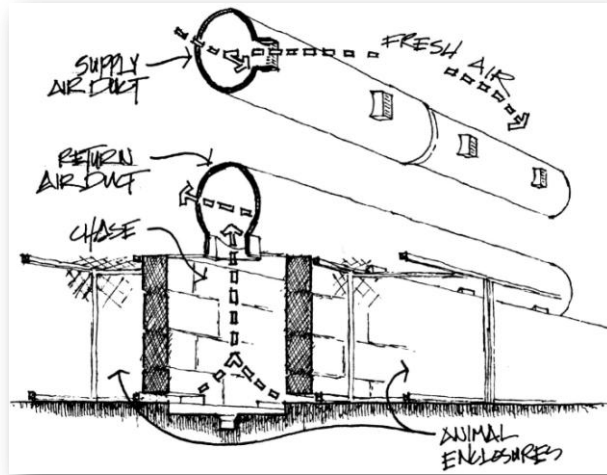


這個收容所附近沒有消防栓，必須準備儲水槽供應火災自動灑水系統。

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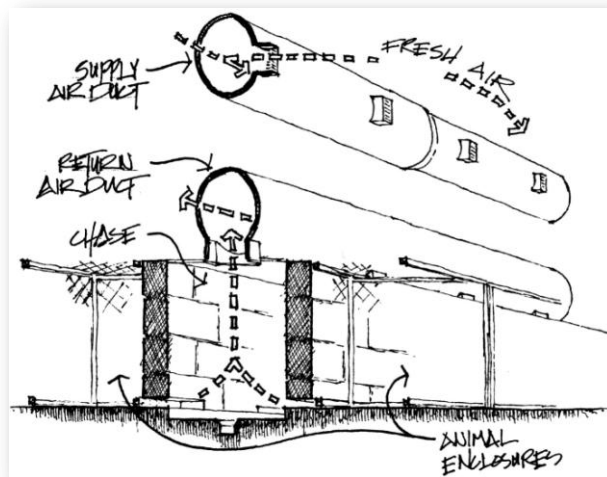
HVAC / Plumbing Connection



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暖通空調與配管



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HVAC



The HSUS recommends at least 12 to 15 air exchanges per hour to maintain animal health, good ventilation, and help control odors in kennels.



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暖通空調



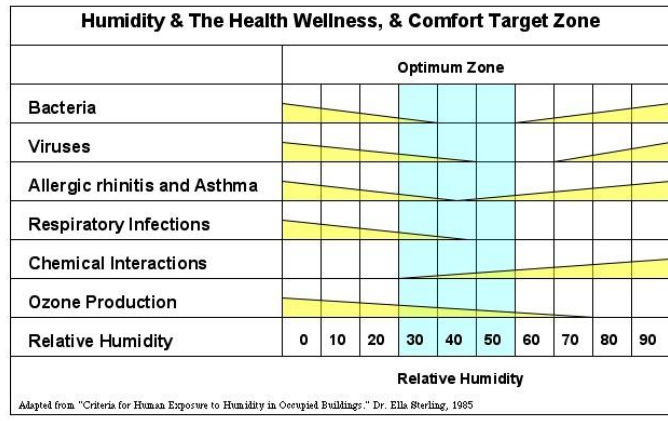
美國人道協會（HSUS）建議，為了維持動物健康，良好通風，並協助消除犬舍氣味，換氣率至少需達每小時12至15次。



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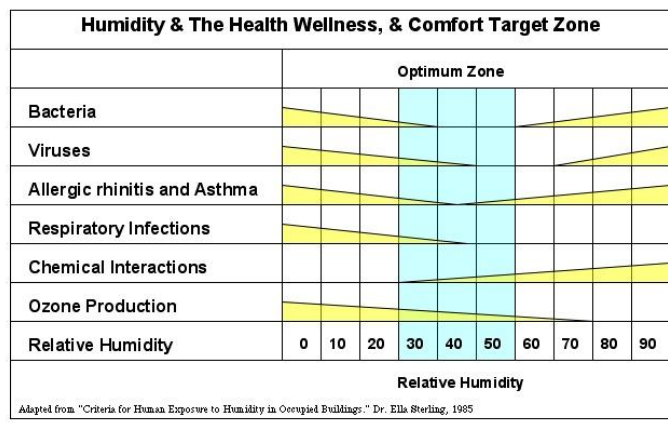
Control Humidity for Comfort & Disease Control



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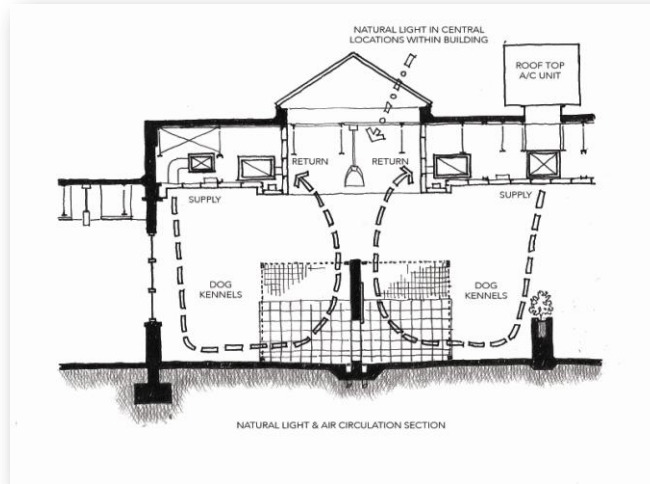
控制濕度以利控制疾病， 提高舒適度



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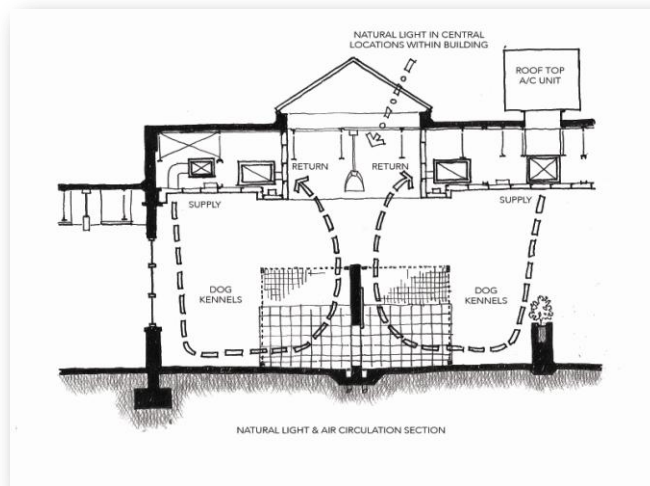
Air Circulation in Kennel



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犬舍中的空氣循環



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HVAC



On the left, the supply pushes air into the kennel and the exhaust draws air over the dogs through the trench drain and out. Photo above shows a heat wheel.



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暖通空調



右圖顯示空氣打進犬舍，排氣裝置再將空氣往上抽，透過排水溝渠排出。上圖為暖氣機。



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HVAC - Cats



Cat housing, especially, needs good ventilation for disease and odor control.

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暖通空調 - 貓舍



貓舍尤其需要好的通風，以控制氣味和疾病。

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Ventilation for Cat Cages / Condos



Photos shows the ventilation system behind where the bank of cat cages will be installed.

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貓籠/貓公寓的通風系統



成排貓籠將會靠牆擺放，牆上已裝設通風系統

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Ventilation for Cat Cages / Condos



Flex-duct allows the cat cages to be moved forward for cleaning



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貓籠 / 貓公寓的通風系統



伸縮輸送管讓貓籠可往前移，以便清洗



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Commercial Equipment



Commercial equipment has specific power and ventilation requirements.

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營業用設備



營業用設備有特定的馬力和通風需求

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Air Conditioning Retrofit



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翻新/改造空調設施



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Increase Energy Efficiency Through Design



Lied Animal Shelter, Las Vegas
Tate Snyder Kimsey Architects



Santa Barbara Animal Hospital
Cape Coral, Florida

Physical orientation, ventilation, solar panels, and shade structures are some design techniques to make buildings more energy efficient.

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透過設計增加能源效益



Lied Animal Shelter, Las Vegas
Tate Snyder Kimsey Architects



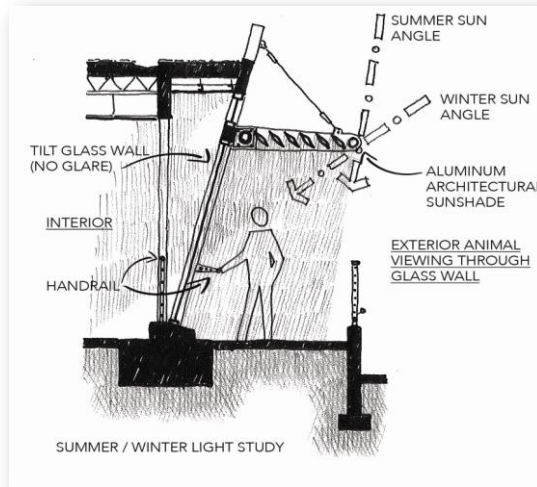
Santa Barbara Animal Hospital
Cape Coral, Florida

建物座向、通風、太陽能板、遮蔽結構等設計技巧，都有助於節能。

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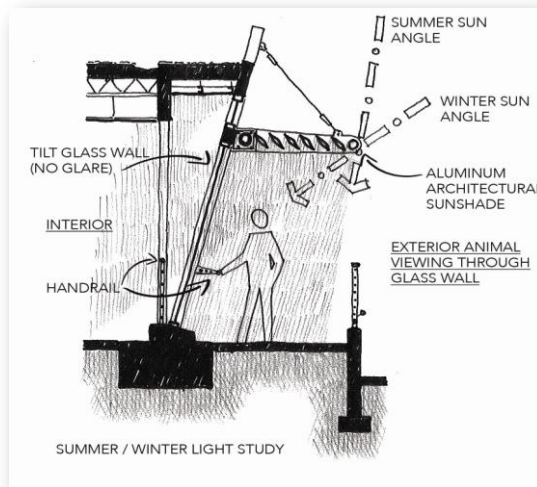
Light Study



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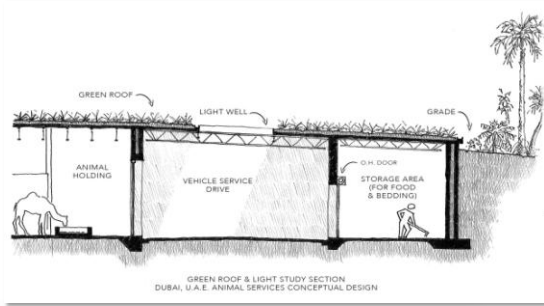
分析光照



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Green Roofs

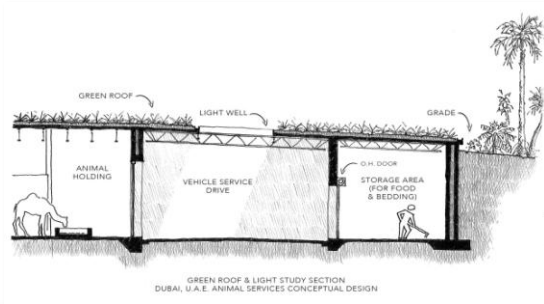


Montgomery County (Maryland) Animal Services

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綠色屋頂

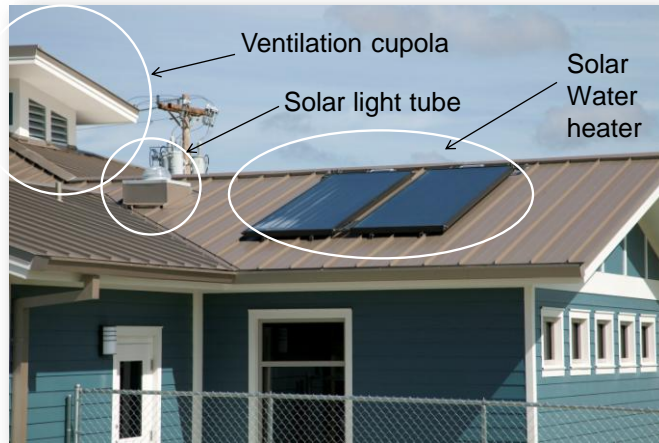


Montgomery County (Maryland) Animal Services

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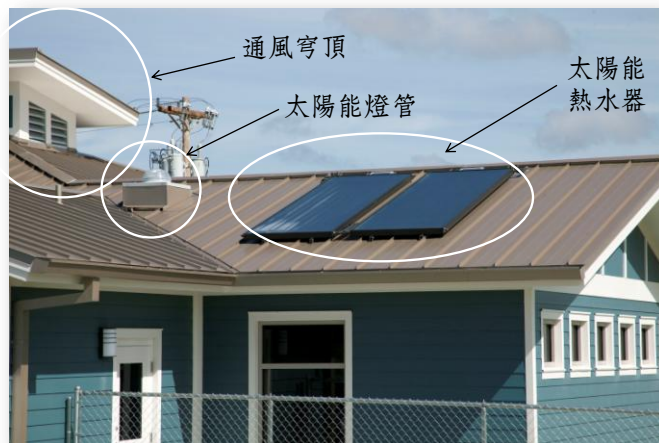
Energy Efficient Design



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節能設計



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Solid Surface Material



Washington Animal Rescue League used DuPont™ Corian® in its cat condos and dog adoption kennels. (Credit DuPont™ Corian®)

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堅固的表面材質



華盛頓動物救援聯盟採用杜邦™可麗耐®人造石來打造貓公寓和認養區犬舍。

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Millwork

- Location
- Wood
- Laminates
- Solid surface
- Raised pad



Millwork with bull-nose edge on raised pad with resinous flooring.

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木工

- 地點
- 木材
- 層壓版
- 堅固表面
- 抬高櫃底



Millwork with bull-nose edge on raised pad with resinous flooring.

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Millwork Alternatives



Purchasing used stainless steel restaurant equipment saved money.

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木作設備的替代品



向餐廳收購二手不鏽鋼櫥櫃以節省成本

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Millwork Alternatives



Counters are used stainless steel restaurant equipment. Sink inserts and faucets can be replaced and new skirts can be attached to hide equipment.

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木作設備的替代品



購自餐廳的二手不鏽鋼櫥櫃，可更換水槽及水龍頭，也可安裝壁腳板來遮住下方器具

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Cleaning Equipment



Wet vac



Portable hose reel



Tile cleaning

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清潔用具



濕式吸塵器



活動式水管捲軸



瓷磚清洗

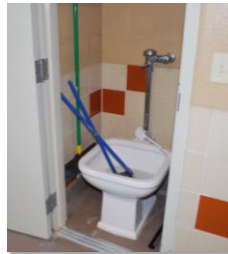
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Cleaning Methods



Lower photos show a service sink designed to flush solid waste.



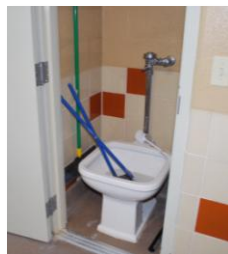
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清潔方式



下圖水槽
利於沖洗
固體穢物



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Americans with Disabilities Act



The safety inspector said the placement of this hose reel was a hazard for visually impaired persons. The drum was placed to create a larger obstacle that sits flush with the floor.

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《美國殘障法案》



安檢人員認為水管捲軸的放置方式可能危及視障人士的安全，因此應放置水桶等大型物品形成明顯目標。（障礙設施應避免）

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Cleaning System



New spray wash systems pre-mix cleaning chemicals and use less water pressure to help prevent atomization of dirty water that spreads germs.



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清潔系統



新式噴水系統可預拌清潔劑，使用較低水壓，防止髒水「霧化」擴散細菌。



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Selecting Materials



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選擇用料



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Review

- The Cost Triangle
Location - Quality - Maintenance
- Materials to avoid
Long term vs. short term effectiveness of different materials
- Recommended air exchanges
- Connection between plumbing and HVAC systems



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重點回顧

- 成本三角圖
- 應避免使用的材料
- 長短期效益的考量
- 建議換氣率
- 暖通空調與配管

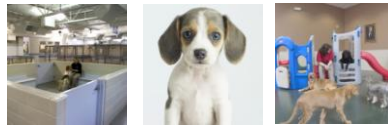


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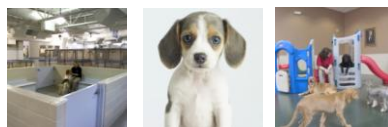
*Professional Animal Shelter
Design & Construction*

Questions & Answers



專業動物收容所設計與建築

問與答



*Professional Animal Shelter
Design & Construction*

Construction Issues

Presented by

Richard S. Bacon, AIA, LEED-AP BD+C, CGC



專業動物收容所設計與建築

建築議題

主講者

Richard S. Bacon, AIA, LEED-AP BD+C, CGC



Learning Objectives

- Understand proper construction techniques for animal shelters
 - Vapor barriers
 - Concrete slabs in animal shelters
 - Trench drains
 - Glazed masonry walls
 - Resinous floors
- Identify which systems take a long time to be delivered (long-lead items)
- Understand why details are important.

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學習目標

- 動物收容所需要的適當建築技術
 - 水汽阻隔
 - 水泥鋪面
 - 排水溝渠
 - 彩釉石牆
 - 樹脂地板
- 確認交貨期長短
- 細節很重要

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Construction Observation

- Knowledge of animal related construction issues
- Success is in the details.
- What to look for during construction.



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監工

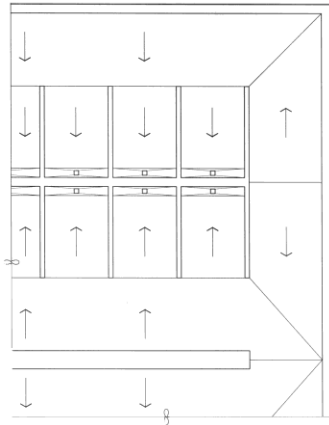
- 與動物知識相關的建築議題
- 細節是關鍵
- 如何監工



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Concrete Slabs and Floors



Kennel slab plan

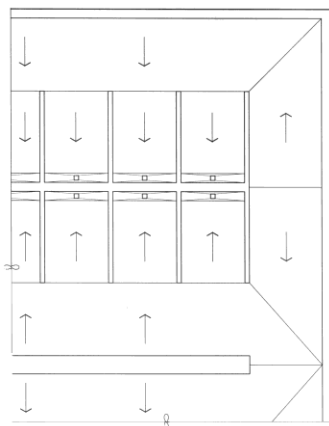
- Standard structural slab
- Strength
- Determine drainage & cleaning protocols
 - Slopes
- Joints & cracks
- Material applications

→ Slope and flow direction

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水泥鋪面



犬舍地板圖示

- 標準結構
- 強度
- 清潔與排水方式
 - 斜面
- 接縫與裂縫
- 材料的運用

→ 傾向與流向

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Concrete Placement Techniques

- Insure total vapor barrier installation
- 5,000 psi concrete strength
(psi = pounds per square inch)
- Insure proper joint placement
- Cure for 28 days
- Pour in checkerboard pattern (if possible)

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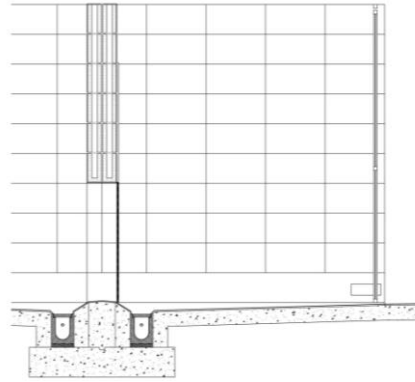
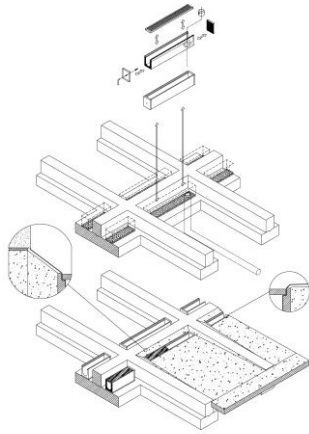
混凝土施作技術

- 確保阻隔水汽
- 5,000 psi 水泥強度
(psi = 磅／每平方英吋)
- 確保適當接合
- 維持28天
- 可能的話使用棋盤式板模

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Kennel Details

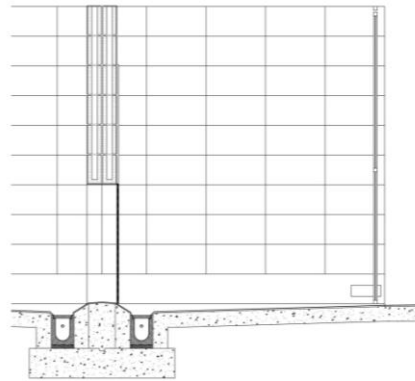
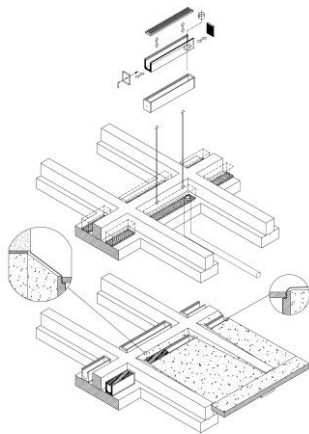


Canine Trench Drain

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欄舍細節

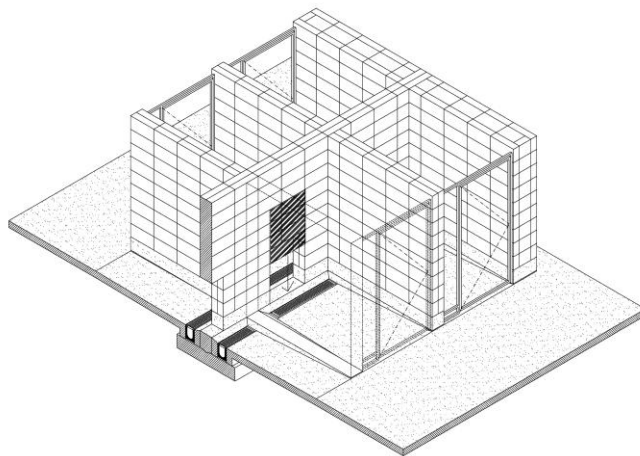


犬舍排水溝

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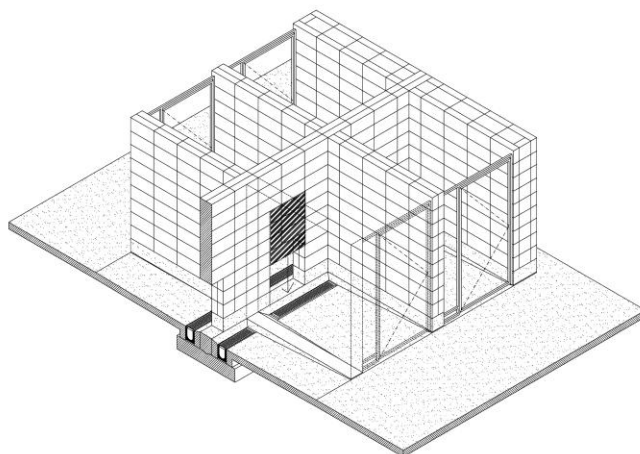
Kennel Details



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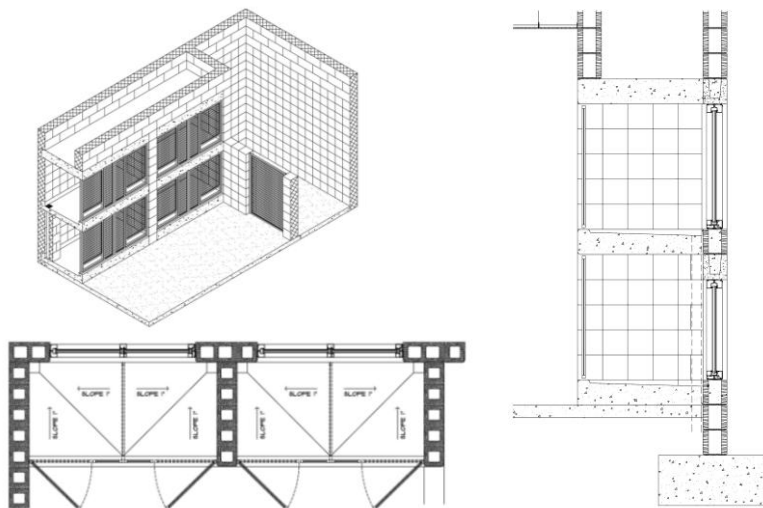
犬舎細節



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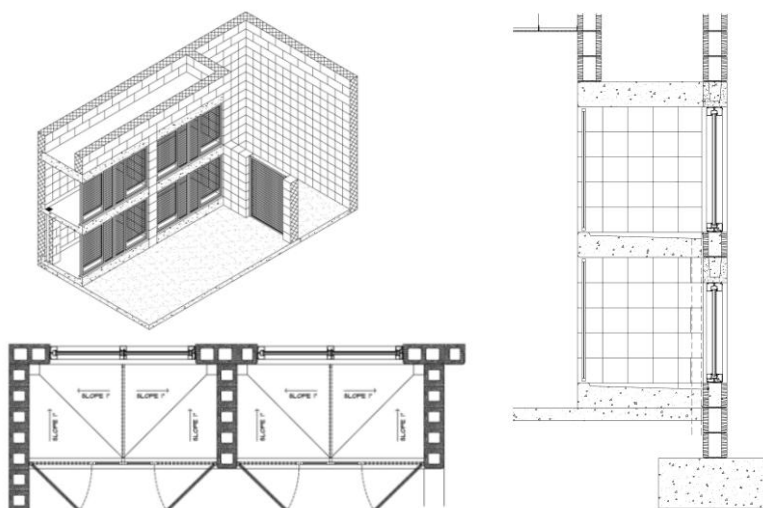
Puppy Kennel Details



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幼犬舍細節



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Vapor Barrier & Kennel Slab Construction



Photo above shows poor protection of vertical steel.



Photo above shows incorrect installation. Steel is uneven and vapor barrier is not taped.

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水汽阻隔與犬舍灌漿工程



照片顯示，直立的鋼筋未受保護。

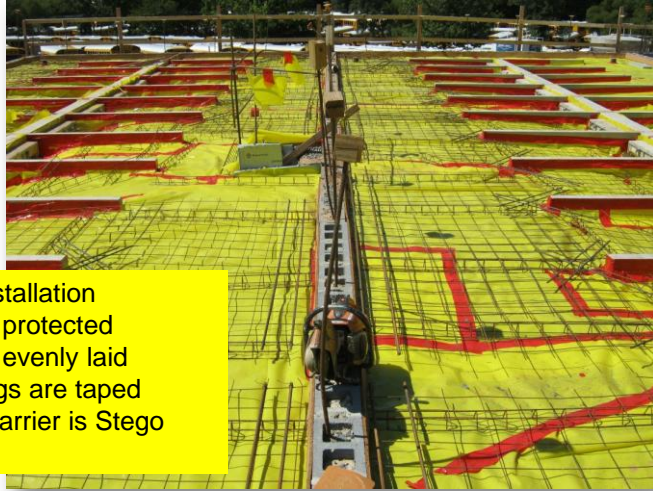


不正確的施作，鋼筋不均勻，防水未用膠帶。

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Vapor Barrier & Steel Reinforcement Installation



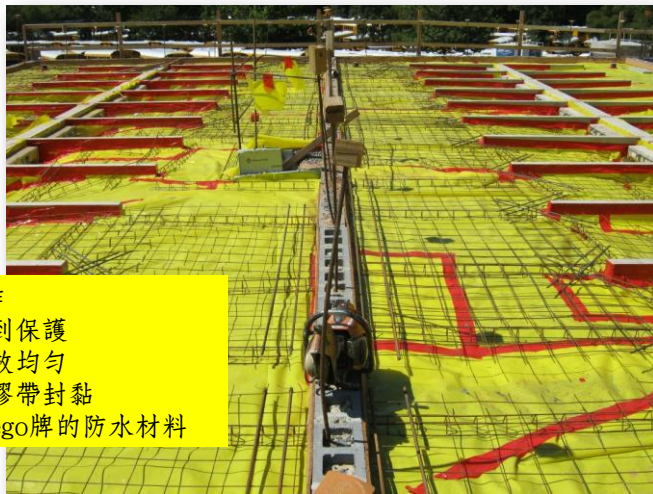
Good installation

- Steel is protected
- Steel is evenly laid
- Openings are taped
- Vapor barrier is Stego brand

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防水與鋼筋強化施作



良好施作

- 鋼筋受到保護
- 鋼筋施放均勻
- 縫隙以膠帶封黏
- 採用Stego牌的防水材料

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Vapor Barrier & Steel Reinforcement Installation



Good
installation

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防水與鋼筋強化施作

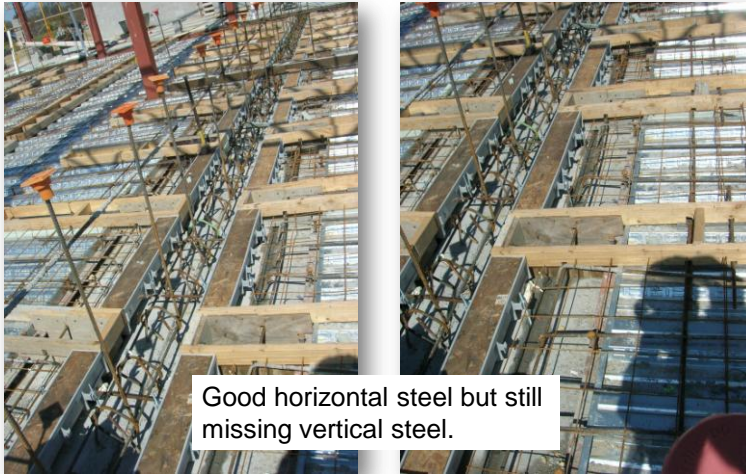


良好施作

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Trench Drain & Slab Construction



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排水溝渠與灌漿施作



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Trench Drain & Plumbing



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排水與管路



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Water to Flushing Trench Drains



Good installation of the spray nozzles for flushing trench drains.

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排水溝的沖刷

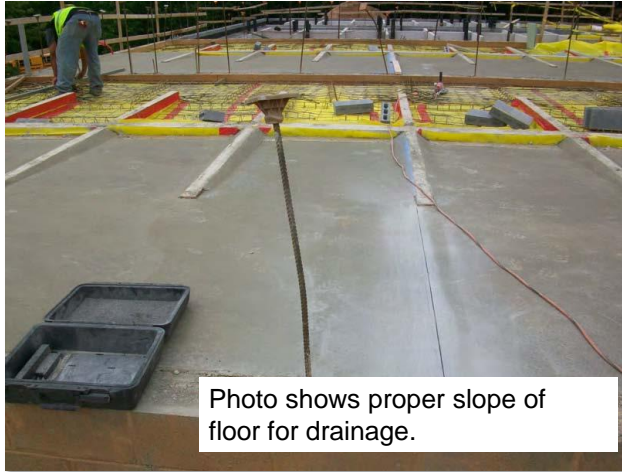


正確安裝噴嘴以利沖刷水溝

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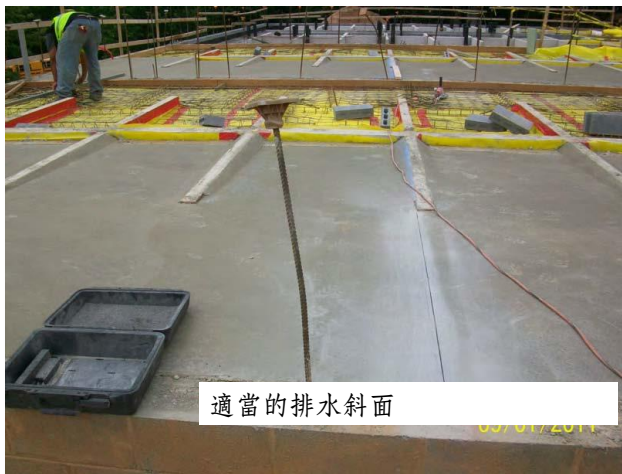
Slope of Slab for Drainage



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排水斜面



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Slope of Slab to Kennel Drains



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水泥斜面利於犬舍排水



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Installing Concrete Slab



Photo shows careful workmanship for concrete slab finishing.

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水泥地面施作



照片顯示工人細心砌平水泥地面

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Trench Drain Installation & Protection



This drain extends above the bottom of the trench. There is no protection in place for the trench or drain during construction.

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排水溝渠的安置與保護



圖片顯示排水管高出水溝底部，施工時沒有任何保護。

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Placement of Trench Drain



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溝渠安置



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Testing Concrete Slab for Moisture Content

If the slab is accepted for resinous floor installation when there is still too much moisture in the concrete, the resinous floor will not adhere properly. Below are recommendations for testing the moisture content.

Installation

The amount of tests required is a simple calculation of the total square feet to be floored, at all grade levels. ASTM F1869 guidelines state three (3) tests for the first 1,000 square feet and one (1) additional test for each additional 1,000 square feet thereafter.

Examples: 1,000 ft² = 3 tests | 10,000 ft² = 13 tests

Test Area/ Preparation

Clean a 20" x 20" area free of flooring, coatings, patching cements, adhesive residue and expose a clean concrete surface. To speed the process, a dustless grinder may be used to clean the surface. Do not use acid etching, water, strippers or clean sweeping agents.

Test Duration

Protect all test sites from damage for 60 to 72 hours.

Results

The final test results are reported as a quantity of moisture expressed as the weight of condensed gas (liquid) in pounds that is emitted over 1,000 ft² area during a 24 hour period.

Results may vary from 0.00 to 30.00 /1,000 ft²/24 hours.

Flooring and Adhesive Requirements

The industry's most stringent vapor requirement is 3.0 lbs. or less. Verify each manufacturer's tolerance before installation of the flooring product.

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測量混凝土濕度

If the slab is accepted for resinous floor installation when there is still too much moisture in the concrete, the resinous floor will not adhere properly. Below are recommendations for testing the moisture content.

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Technical Specifications for Resinous Flooring Systems in Shelters

When selecting a resinous flooring product, ask for and review the manufacturer's technical data sheets. Resinous floors in animal shelters must be able to resist strong chemicals. Look for the results of tests and resistance to-

- Chlorine (5% concentrate)
- Urea solutions (urine)
- Fecal matter

Also, the texture applied during installation is important. It should be slip resistant when wet but not so rough that it is hard to clean. Too rough a surface is hard to sweep and squeegee and will tear-up mops.

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收容所用樹脂地面的技術規格

When selecting a resinous flooring product, ask for and review the manufacturer's technical data sheets. Resinous floors in animal shelters must be able to resist strong chemicals. Look for the results of tests and resistance to-

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Resinous Flooring Detail & Sequence



Avoid rough edges that are hard to get clean where the resinous flooring meets the block wall.



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細節與影響



樹脂地面與牆面接合處，應避免形成難以清洗的粗糙邊緣



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Location & “Puddling”



Drain on the left was placed improperly. The resinous flooring clear top-coat was allowed to puddle around the drain on the right.

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位置及溢流



左圖中的下水孔位置不當，右圖則顯示樹脂溢流阻塞排水。

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Incorrect Slab Installation & Repair

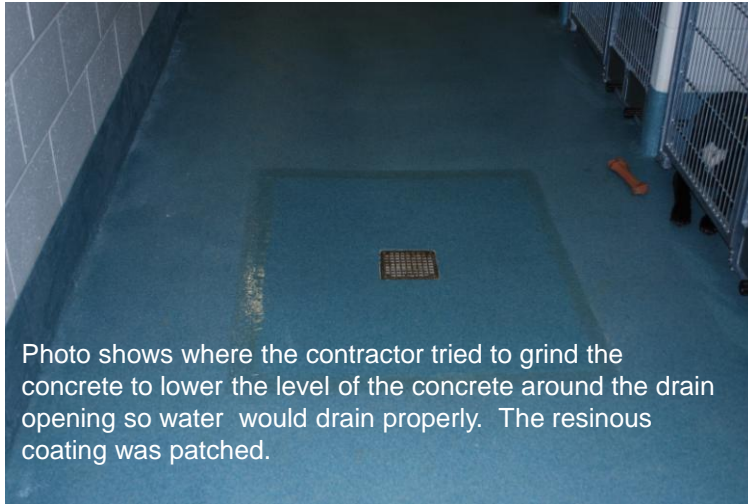
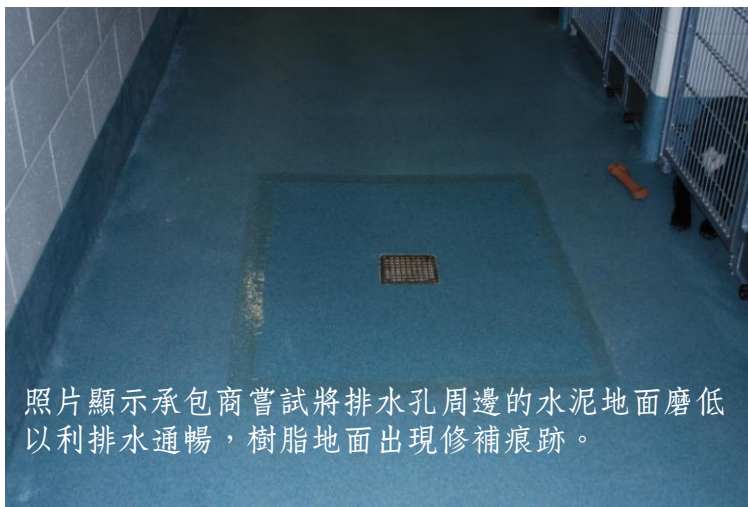


Photo shows where the contractor tried to grind the concrete to lower the level of the concrete around the drain opening so water would drain properly. The resinous coating was patched.

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不正確的水泥施作與修補



照片顯示承包商嘗試將排水孔周邊的水泥地面磨低以利排水通暢，樹脂地面出現修補痕跡。

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Needs Detail

Floor slope needs detail.
Extra stainless steel boot good idea.



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細節很重要

斜面施作細節：右下角加一小段不鏽鋼的
點子看來不錯。



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Water Test for Proper Floor Slope



Run water on the kennel floors to see if the floor drains properly before installing the resinous floor. Water should not sit in corners or puddle.

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以水測試地板斜面



在樹脂地板施作前，用水測試斜面排水功能是否良好。不應有水貯流於角落或窪坑上。

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Cleanable Non-Resinous Floors



Sealed concrete floors are an acceptable alternative to resinous floors if your budget is restricted. Coloring color can be added if desired. The floor will have to be re-sealed every few years.

Do not paint floors, especially in animal housing areas. The paint will not last. It will chip, flake, and rub off making the floor hard to keep clean and disinfect.

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可清潔的非樹脂地板



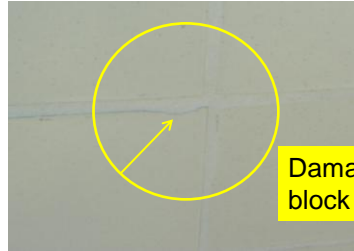
如經費有限，可採膠封水泥地面代替。亦可上點顏色，但每隔幾年需再密封一次。

勿油漆，特別是在動物欄舍。油漆難以維持，容易脫落，增加清潔及消毒難度。

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Masonry Mock Wall – Quality Control



Damaged block

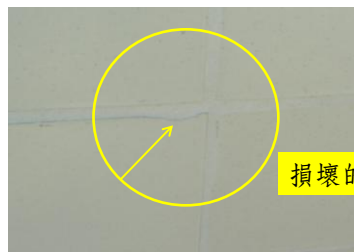
Above and lower right photos show proper joint tolerances.



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砌石模牆的品管



損壞的磚塊

上圖及右下圖顯示適當的接縫施作



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Masonry Mock Wall Matching Colors in the Job Site



Discussing the architect's expectations before the walls are built improves the final product. Photo on right shows how the grout colors are confirmed where different types of tile will meet.

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在施工现场討論顏色搭配

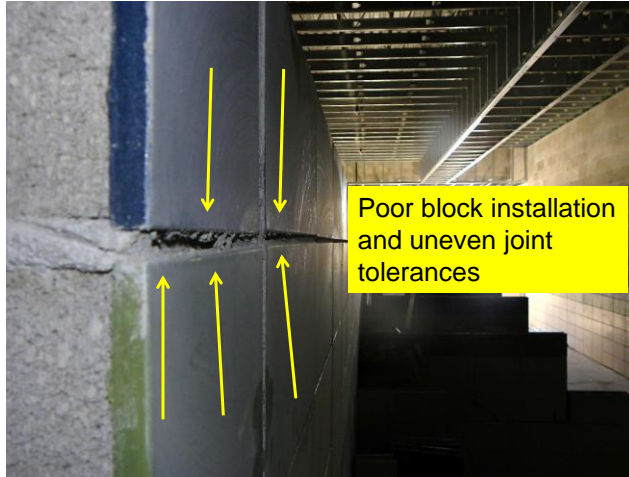


牆面施作前與建築師討論有助於保障工程品質。右圖顯示磁磚接合處的薄膠泥顏色搭配。

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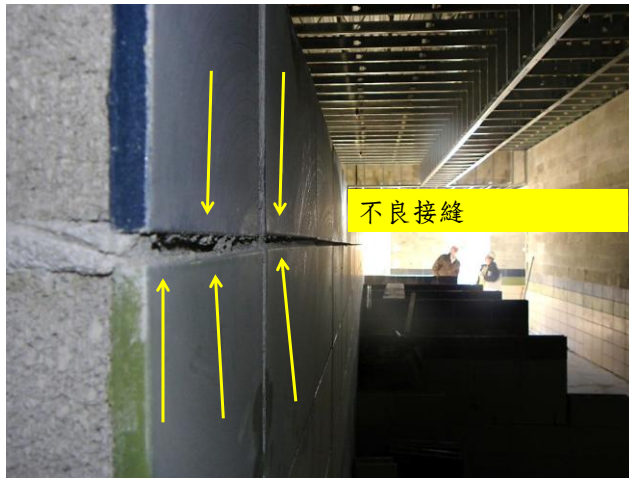
Block Joints



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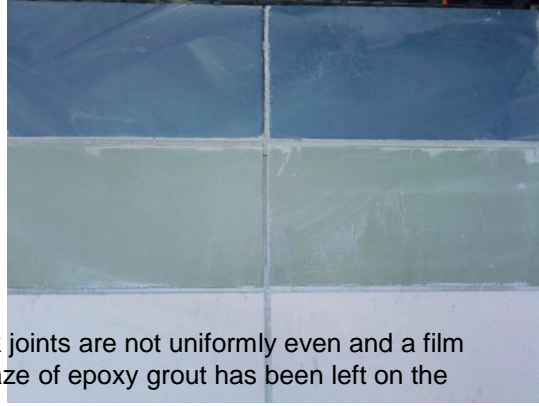
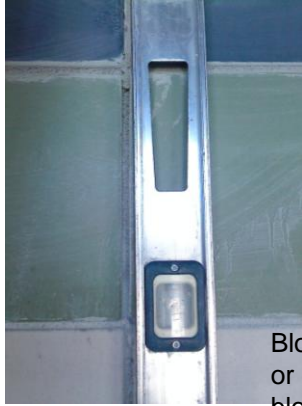
接縫



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Workmanship Quality Control

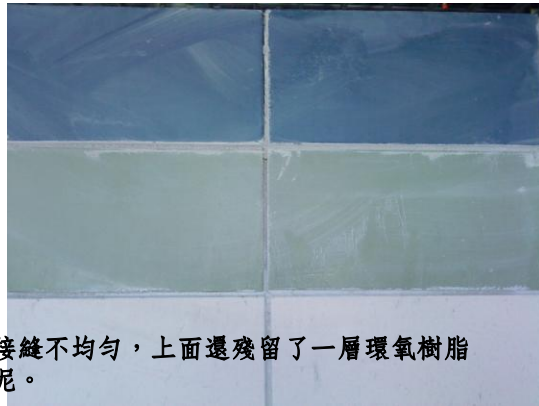


Block joints are not uniformly even and a film or glaze of epoxy grout has been left on the block.

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施作品管

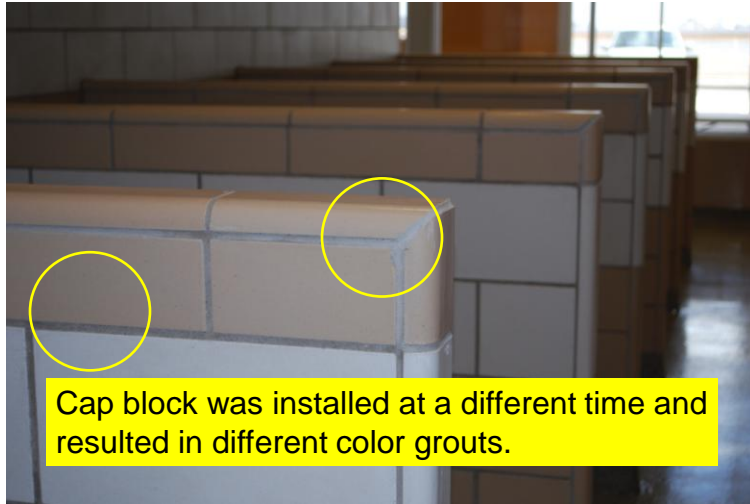


磁磚接縫不均勻，上面還殘留了一層環氧樹脂薄膠泥。

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Grout Consistency & Block Type



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磁磚形式與薄膠泥的一致性



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Craftsmanship at Work



This block mason is carefully laying out the curved wall of the cat feature area.

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施工藝術



石匠正小心施放磚塊形塑出圓弧形貓舍

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Wall Finishes



Because of its rough texture, the wall on the left side of the kennel cannot be cleaned and properly disinfected.

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牆面塗裝



左邊牆面粗糙，難以清潔及適當消毒。

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Concrete Masonry Unit (CMU) Kennel Walls



For good quality CMU kennel walls-

- Proper joint tolerances
- Use epoxy grout
- Check for moisture content before painting
- Use filler coat first to fill all small holes
- Use 2-part epoxy paint
- Apply two coats of paint

Epoxy painted CMU kennel walls are a good alternative if you have a restrictive budget, but they will require re-painting every few years. Structural glazed block never requires repainting so your maintenance cost is less for this material.

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水泥樹脂欄舍牆面



好的CMU牆面：

- 接縫良好
- 使用環氧樹脂薄膠泥
- 上漆前檢查濕度
- 填補所有的小洞
- 使用2-part 環氧樹脂漆
- 漆兩次

如經費有限，可採用CMU，但每隔幾年必需重新粉刷。磁磚則無須再粉刷，維護費用較低。

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Feline Feature



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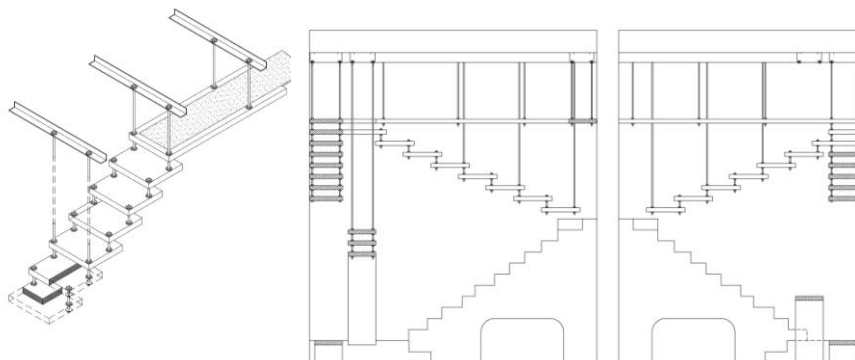
展示貓舍



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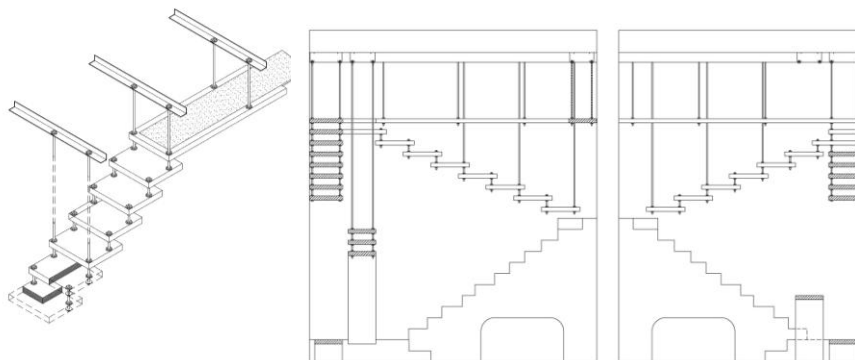
Feline Feature



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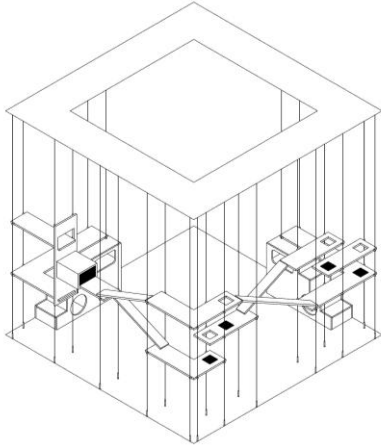
展示猫舍



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Feline Feature

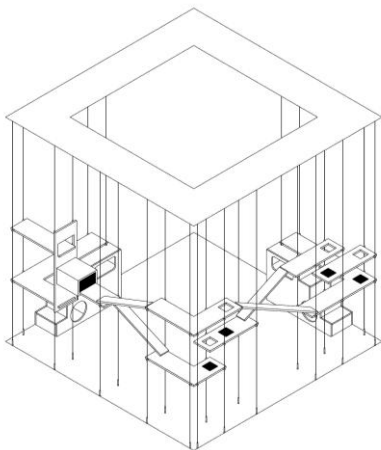


Steel is erected for the cat feature room.

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展示貓舍



豎立鋼材以便建構貓舍

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Functionality & Maintenance

Dirt will collect on top of the duct work and air handlers making this kennel hard to keep clean.



The aisle between the kennels is too narrow. Try to make them wide enough for a person leading a dog on a leash to pass-by when a kennel door is open.

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功能與維修

欄舍上方的導管與通風管容易積累灰塵，難以維持清潔。

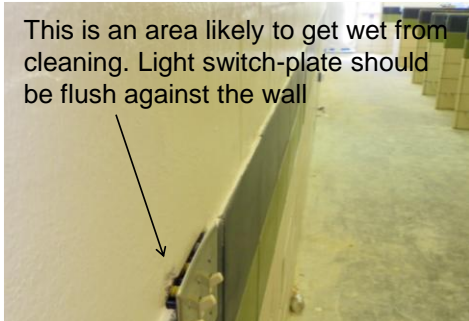


走道太窄，應嘗試拓寬，以便欄舍門打開時，還可以牽著狗通過。

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Quality of Workmanship



(Photo on right) The plumber did not pay attention to the plans. This pipe should not protrude from the wall where the stacked washer and dryer will go.

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施作品質



右圖顯示水電工並未按圖施作，管路不應突出牆面。該處需置放洗烘衣機。

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Long-lead Items

- Kenneling systems
- Glazed masonry
- Resinous flooring (epoxy or urethane flooring)
- Cleaning systems
- Special equipment (grooming tubs, surgery tables, X-ray equipment, for example)

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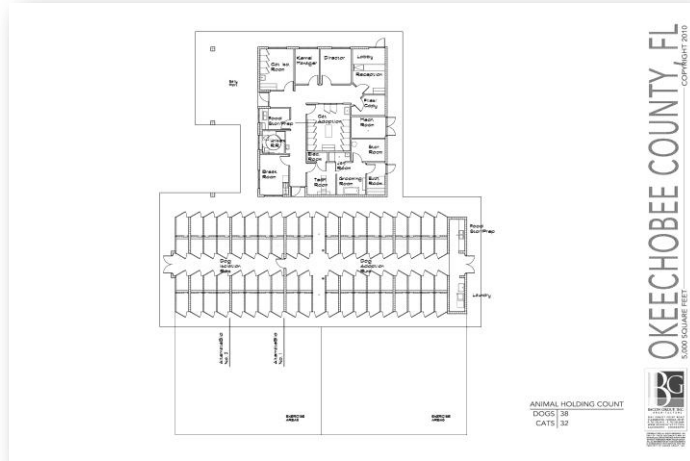
交貨期長的物料

- 欄舍模組
- 磁磚
- 樹脂地板
- 清潔系統
- 特殊設備（例如美容澡盆、手術台、X光機等）

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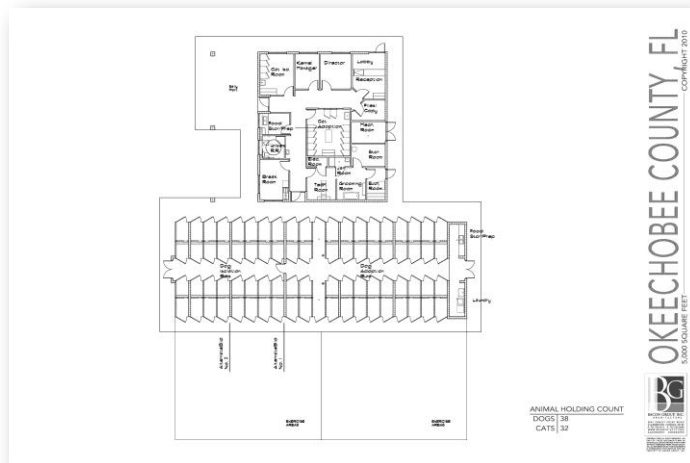
Basic Shelter Project Makes a Dramatic Difference



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基礎施作帶來戲劇性變化



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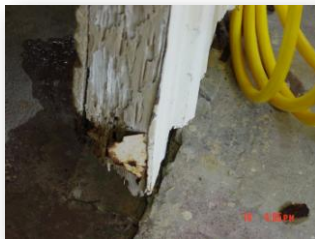
Before & After - New Shelter



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改造前與改造後-煥然一新的收容所



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Before & After



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改造前與改造後



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Before



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改造前



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After



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改造後



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Before



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改造前



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After



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改造後



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Good Design + Quality Construction



- These kennels have
- Good lighting
 - Acoustical ceiling
 - Ample ventilation
 - Some group housing
 - Covered drains inside the each run
 - Floor drains for general cleaning
 - Good quality block construction
 - Good resinous flooring application

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好的設計 + 有品質的施工



- 這些犬舍具有：
- 良好照明
 - 吸音天花板
 - 通風良好
 - 部分採群飼
 - 欄舍內部排水加蓋
 - 走道地面沿牆有水溝，以利清潔
 - 磚牆施工良好
 - 樹脂地面施作良好

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Review

- Proper installation of systems and equipment makes it easier to clean and maintain the shelter.
- What to look for
 - Vapor Barrier
 - Slab Construction
 - Trench Drains
 - Masonry
- Long lead Items
- Why details matter



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重點回顧

- 系統與設備的適當安置有助於收容所的清潔與維修
- 注意
 - 水汽阻隔
 - 水泥施作
 - 排水溝渠
 - 石工技術
- 交貨期
- 為什麼細節很重要



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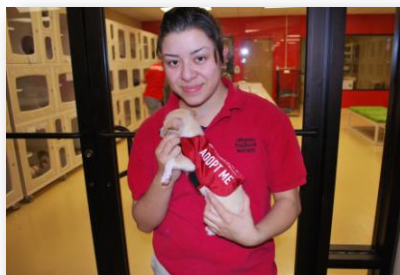
*Professional Animal Shelter
Design & Construction*

Questions & Answers



專業動物收容所設計與建築

問與答



EDUCATION, TRAINING AND MEETING SPACE:

- Requirements for staff and public education program
- Training room requirements
- Board/conference room
- Auditorium
- Audio/visual equipment

MISCELLANEOUS AREA REQUIREMENTS:

- Food storage, conditioned or dry storage
- Maintenance
- General storage
- Cage storage
- Washer/dryer area
- File storage
- Medical storage, security of
- Office supplies storage
- Dispatch
- Night drop-off
- Kitchen, break room
- Vehicle stocking/washing
- Administrative functions
- Restrooms, showers, locker rooms
- Systems, telephone, computer, energy management, 911 requirements
- Power outlets

PROGRAMS:

- Adoption
- Education
- Spay/neuter
- Relationships to outside entities, such as veterinarians, County government, humane societies

BUDGET:

- Determine budget parameters
- Fund raising goals
- Value engineering
- Project delivery method (bidding, negotiations, design / build etc.)

IMAGE TO PROJECT:

- Cost
- Building exterior and interior



GET READY TO DESIGN

Presented are areas that should be discussed as you begin the planning process for shelter design and construction. These are some of the major areas that a design consultant would research with the client as the programming phase of design is started. This list is not comprehensive, and you will want to add areas that are specific to your program's and shelter's needs. Use this list to begin to plan your new shelter's size and scope.

SITE – CIVIL:

- Zoning
- Accessibility to staff/users
- Site water management
- Future expansion
- Noise levels affecting adjacent property
- Is burial planned on-site?
- Bark parks
- Exercise area and agility course

CIRCULATION:

- Ingress/egress public, staff, deliveries, public surrenders, sally port
- Parking
- Public access to adoption, administration, other areas
- Staff access to function areas
- Walking distances for staff
- If surgery is provided, circulation for doctors/technicians to surgery room, lab, pre/post-op

MATERIALS:

- Evaluation of exterior building materials & interior public area materials (includes finishes)
- Evaluation of high-maintenance areas, finish floor materials & kennel design

SECURITY:

- Site ingress/egress
- Facility ingress/egress
- Types of security systems, monitoring
- Lighting

ACOUSTICS:

- Noise from surrounding property to the kennels and vice versa
- Noise from kennels to function areas within building including lobby, surgery, administration, and separation of cats from dogs
- Materials selection for high-humidity areas and other function areas

ANIMAL HOUSING:

Dog Housing:

- Indoor vs. outdoor runs
- Individual caging vs. built-in runs or combination
- If dog kennels are a built commodity, have all factors been considered, including waste removal, temperature control, cleaning, ventilation and visual sight lines
- Separation of adoption, healthy holding, surrender holding, in-processing holding, isolation (sick) and feral
- Stress control

ANIMAL HOUSING:

Cat Housing:

- Indoor vs. outdoor runs, ventilation, waste removal, etc. as above
- Types of housing, e.g. condos, malls, individual cages, group, real-life rooms
- How many cats in each run? Shelving, access to fresh air & sunlight
- Separation of adoption, healthy holding, surrender holding, in-processing holding, isolation (sick) and feral
- Stress control

EUTHANASIA:

- Animal prep
- Crematory
- Burial
- Disposal
- Storage

LIGHTING:

- Exterior lighting
- Kennel lighting
- Indoor vs. outdoor lighting

VENTILATION:

- Air changes per hour (volume exchange)
- Heating and AC, building & kennels
- Separation between kennel & public areas
- Temperature control

ADOPTION:

- Access for public
- Friendly atmosphere, noise levels
- Location for viewing & handling
- Handicapped accessibility

MEDICAL SERVICES:

- Exam rooms
- Surgery
- Laboratory
- Pre/post-op
- Recovery/holding

CUSTOMER SERVICES:

- Atmosphere & noise level
- Records accessibility
- Handicapped accessibility
- Location related to adoption & reclaiming



Design and Construction Project Definitions and Related Information

These definitions are intended to provide basic information about the professionals or processes commonly encountered during a design and construction project in the United States. Almost all design and construction professionals are licensed and regulated by state government. While there are many similarities, these laws vary from state to state. Take the time to educate yourself about the laws, requirements, and regulations of your state before you start your project. Many state licensing boards have consumer education sections on their web sites.

Design Consultants and Construction Related Professionals

Acoustical Consultant - state licensed consultant who is qualified to test noise levels and design or recommend design features that will moderate ambient, external or internal noise levels.

Architect - state-licensed consultant who is responsible for the design and coordination of the overall project including site, building and systems. The project architect will serve as the interface between the Owner, consultants and outside agencies.

Architectural/Engineering Consultant - design consultant, usually licensed, who has special knowledge of and experience with specific building types or systems required for a project, for example a swimming pool engineer.

Civil Engineer - state-licensed consultant responsible for a project site design including drainage, water management, paving, roadways and utilities related to the project. The civil engineer does not design electrical service or landscaping. On larger projects, this engineer is responsible for assisting in the site master planning including traffic flow.

Cost Estimator - consultant qualified to review the design documents and prepare Statements of Probable Construction Cost based on project type, prevailing materials costs and labor conditions of the project location. This consultant may also provide value engineering, review construction schedules, pay requests and contractor Change Orders.

Designer/Computer Drafter - individuals of widely varying degrees of skill who work under the direct supervision of a licensed architect or engineer to design portions of a project. While manual drafting is still used in some cases, most projects are now designed and drafted with the aid of computer programs such as CADD (computer aided drafting and design). Some advantages of computer drafting are greater accuracy in the construction documents, easier redesigns, and direct communication with engineering consultants and files management. Disciplines often digitally transfer current drawings to each other via the internet.

Electrical Engineer - state-licensed consultant responsible for all electrical (power and lighting) including site designs for the project; concerned with all communications including telephone and computers, television and power generation, etc.

Environmental Consultant - a variety of usually industry certified or state-licensed consultants qualified to study, recommend, design and perform remedial work concerning a myriad of environmental tasks such as wetlands mitigation, endangered flora and fauna on a site, chemical/fuels contamination or asbestos and lead-based paint abatement.

Geotechnical Engineer - state-licensed consultant responsible for testing and determining soil and sub-surface conditions. These test results help determine building placement as well as foundation and pavement design. Investigation may further define environmental and hidden conditions.

Landscape Architect - state-licensed consultant responsible for the landscape design, plantings, and irrigation system, some site permitting, and site amenities including lighting, furnishings, accessories, etc.

LEED® AP - A design professional with accreditation from the U.S. Green Building Council in sustainable design.

Mechanical Engineer - state-licensed consultant responsible for all the mechanical systems such as HVAC (heating, ventilating, air conditioning) systems. This consultant is often the plumbing engineer, too.

Plumbing Engineer - state-licensed consultant responsible for the plumbing and fire suppression systems and may include the water supply, waste water and storm water systems, etc.

Roofing Consultant - qualified, and often industry-certified, consultant who evaluates, recommends, designs and reviews the construction of roofing systems for structures. This consultant is often involved in renovations and remedial projects.

Structural Engineer - state-licensed consultant responsible for the structural infra-structure of a building including foundations, wall construction, roof framing, etc. conforming to all code requirements including wind and hurricane and snow loads. Threshold Inspectors are also structural engineers.

Surveyor - state-licensed consultant responsible for establishing site boundaries including legal descriptions, set backs, easements, etc., existing and new building locations, elevations (grades), utilities, wetlands, trees, etc.

Design Phases

Programming - this phase determines both internal and external spaces required for the project. This may include the size, location, relationship to other spaces, furnishings, equipment, and all other support information.

Pre-design - site evaluation, existing structure evaluation, space needs planning, investigation into development and permitting requirements, programming, and preliminary floor plans.

Schematic - this phase develops the program into a two or three dimensional graphic format. Scale is developed, relationships are further refined, systems are reviewed and materials are evaluated. Basic costs are established.

Design Development - this phase refines the schematic phase and establishes in graphic and written format, the entire building including plans, elevations, systems, materials, equipment, etc. A more detailed Statement of Probable Construction Cost is provided.

Construction Documents - this phase sets forth in both graphic and written format the construction documents for both bidding and construction. This is the culmination of the design process. A comprehensive Statement of Probable Construction Cost is provided.

Bidding - during this phase contractors review the contract documents and contract requirements and submit a fee proposal to complete the construction. This usually includes both cost and construction schedule. The architect is responsible for plan interpretation, clarifications, bid review and recommendations.

Negotiation - In lieu of bidding, one to three pre-qualified contractors may be asked to submit a fee for construction that is a negotiated price. This avenue of contractor selection eliminates the time expended during a formal bidding procedure. This may not be possible for government projects.

Construction - this is the time where the successful bidder is contracted to complete the construction of the project. Architects/engineers provide construction observation services where members of the design team observe the progress of construction to assure the building is built according to the intent of the design and according to the permitted construction documents. Product / system submittals and shop drawings are provided by the contractor / sub-contractor for review by the design team to assure the products and systems specified are being installed. Architects also review/approve contractor's pay request, perform a "punch-list" review and substantial completion walk-through review. Close-out documents, technical manuals, as-built drawings, and warranty information on the building's systems, etc., are submitted to the architect for review and submission to the owner.

Basic and Non-Basic Design Related Services

The following is a list of what is considered Basic and Non-Basic Services offered by an Architect and/or the design team (in the United States).

Basic Services

- Schematic Design
- Design Development
- Construction Documents
- Bidding
- Construction Observation

Non-Basic Services

- Programming
- Boundary and Topographic Surveys
- Geotechnical and Soils Testing
- Environmental Evaluation, i.e., asbestos and lead-based paint surveys and testing
- LEED® Certification

- Acoustical Engineering and testing
- Security / CCTV systems design
- Furniture, Fixtures & Equipment (FF&E) specifications
- Permitting and Permit Expediting
- Extensive Interiors Design, i.e., furniture systems
- Detailed cost estimating
- Value Engineering (VE)
- Construction Administration (a more extensive version of Construction Observation that has greater legal implications)

Permitting

Permit Expediter – Individual who coordinates and monitors the site and building documents permitting process, especially in jurisdictions known to have lengthy and complicated review requirements.

Plans Reviewers – this representative of a local, state or federal entity is responsible for reviewing and qualifying that construction plans meet local, state, and national building codes, fire safety codes, accessibility codes, etc.

Construction

Building Inspector - this representative of a local, state or federal entity is responsible for reviewing the construction relative to the codes of his/her jurisdiction.

Clerk-of-the-Works - responsible for documentation of the day-to-day construction activities, expedites official requests for information, proposals and change orders, verifies with the architect the accuracy of pay requests prior to submission to the owner, maintains clear and correct lines of communication between all parties, and coordinates move-in and close-out documents and any systems training. Clerks are present full-time on the construction site, may be an employee of the Owner or may be provide via contract with the architect. Because of cost, clerks are utilized most often on larger projects. In the absence of the full-time clerk, the architect, or representative from the design team, is usually required to be on-site on a weekly basis to provide construction observation.

General Contractor - this entity is responsible for the overall construction of the project including coordination of the sequence of work, sub-contractors and schedule. The contractor is legally contracted with the Owner, not the architect. General Contractors (GC) are regulated by the state and usually are state licensed.

Sub-contractor - this entity works for the prime contractor for specific areas of construction. The sub-contractor is legally contracted with the prime contractor and most are state licensed in their specialty.

Superintendent - works for the GC and is responsible for the day-to-day supervision of the job site.

Project Delivery Methods

Design/Bid/Build - this is the most recognized method of project delivery. The Owner selects a design entity to design the project to budget and the Owner's needs. The contract documents are then bid with the contract awarded to the most responsive (and often the lowest) bidder. The Owner then enters into a contractual relationship with the contractor. The architect and contractor do not have a contractual relationship. Advantages of this method are it is suitable for competitive bidding, has a system of checks and balances, and

insurance/bonding programs are well defined. Disadvantages include diffused responsibility and project delivery may be slow. Always selecting only the lowest bidder may exclude a more qualified contractor who can deliver a better finished product.

Design/Build - this method of project delivery is used when the Owner desires a single source of contact and responsibility. Both the architect and contractor act as a single contractual entity. The advantages for the Owner may include faster delivery time, earlier knowledge of construction costs, and lower incidence of claims. Some disadvantages include reduction of checks and balances and not as much assurance that materials of lesser quality are being substituted without the Owner's knowledge.

Partnering - this method of project delivery requires the owner to enter into contracts with the architect and contractor at about the same time. All three entities work together to establish the most cost effective project. This method endeavors to eliminate adversarial relationships.

Construction Management (CM) - a project delivery method where the Owner contracts directly with a Construction Management firm that in turn contracts with the trade contractors. The Owner contracts with the architect. Advantages include preconstruction involvement by the contractor, cost savings and better scheduling. Disadvantages may include too much risk and burden on the Owner while modified CM is not very different from design/bid/build.

Revised 10/2011

Housing Calculations for Capacity

(Example)

Census Period: 10/1/05 – 9/30/06

Cats

Confiscate + Owner Surrender + Return

1,874 cats

1,874 x 5 days (assumed holding period) = 9,370 cats

9,365 cats / 365 days = **26 cats / day**

26 cats x 10% growth factor = **29 cats**

26 cats x 15% growth factor = **30 cats**

26 cats x 25% growth factor = **33 cats**

Stray/Healthy + Adoption Cats

7,116 cats

25% assigned to Adoption housing:

7,116 cats x .25 = 1,779 adoption cats

75% assigned to Stray/Healthy Hold housing:

7,116 cats x .75 = 5,337 stray/healthy hold cats

Adoption Cats

1,779 x 14 days (assumed holding period) = 24,906 cats

24,906 cats / 365 days = **69 cats / day**

69 cats x 10% growth factor = **76 cats**

69 cats x 15% growth factor = **80 cats**

69 cats x 25% growth factor = **87 cats**

Stray/Healthy Hold Cats

5,337 x 5 days (assumed holding period) = 26,685 cats

26,685 cats / 365 days = **74 cats / day**

74 cats x 10% growth factor = **82 cats**

74 cats x 15% growth factor = **86 cats**

74 cats x 25% growth factor = **93 cats**

Feral/Cruelty Housing Units

33 x 5 days (assumed holding period) = 165 cats

165 cats / 365 days = **1 cat / day**

1 cat x 10% growth factor = **2 cats**

1 cat x 15% growth factor = **2 cats**

1 cat x 25% growth factor = **2 cats**

Census Period: 10/1/05 – 9/30/06

Dogs

Confiscate + Owner Surrender + Return

2,109 dogs

2,109 x 5 days (assumed holding period) = 10,545 dogs

10,545 dogs / 365 days = **29 dogs / day**

29 dogs x 10% growth factor = **32 dogs**

29 dogs x 15% growth factor = **34 dogs**

29 dogs x 25% growth factor = **37 dogs**

Stray/Healthy + Adoption Dogs

5,466 dogs

25% assigned to Adoption housing:

5,466 cats x .25 = 1,367 adoption dogs

75% assigned to Stray/Healthy Hold housing:

5,466 cats x .75 = 4,099 stray/healthy hold dogs

Adoption Dogs

1,367 x 14 days (assumed holding period) = 19,138 dogs

19,138 dogs / 365 days = **53 dogs / day**

53 dogs x 10% growth factor = **59 dogs**

53 dogs x 15% growth factor = **61 dogs**

53 dogs x 25% growth factor = **67 dogs**

Stray/Healthy Hold Dogs

4,099 x 5 days (assumed holding period) = 20,495 dogs

20,495 dogs / 365 days = **57 dogs / day**

57 dogs x 10% growth factor = **63 dogs**

57 dogs x 15% growth factor = **66 dogs**

57 dogs x 25% growth factor = **72 dogs**

Cruelty/Feral Housing Units

34 x 14 days (assumed holding period) = 476 dogs

476 dogs / 365 days = **2 dogs / day**

2 dogs x 10% growth factor = **3 dogs**

2 dogs x 15% growth factor = **3 dogs**

2 dogs x 25% growth factor = **3 dogs**

Note: Housing capacity calculations need to include a holding period. Including a growth factor is also advisable.

Housing calculation based on a (5) year average:

Based on straight calculations (no percentage applied for growth)

Cats

Census Period	Owner Surrender, etc.	Adoption	Stay/Healthy Holds	Cruelty/Feral
10/01/04 - 9/30/05	25	77	83	1
10/01/05 - 9/30/06	26	69	74	1
10/01/06 - 9/30/07	21	81	86	1
10/01/07 - 9/30/08	15	89	95	1
10/01/08 - 8/30/09	19	81	87	2
Average	21.2 (22) cats	79.4 (80) cats	85 cats	1.2 (3) cats

Dogs

Census Period	Owner Surrender, etc.	Adoptions	Stray/Healthy Hold	Cruelty/Feral
10/01/04 - 9/30/05	32	55	59	2
10/01/05 - 9/30/06	29	53	57	2
10/01/06 - 9/30/07	29	51	54	3
10/01/07 - 9/30/08	29	51	55	3
10/01/08 - 8/30/09	31	48	52	3
Average	30 dogs	51.6 (52) dogs	55.4 (56) dogs	2.6 (3) dogs

Summary

Total Cat Housing Per Census

22 Owner Surrender units, etc
 80 Adoption units
 85 Stray/Healthy Hold units
3 Cruelty/Feral Hold units
 190 cats

Total Dog Housing Per Census

30 Owner Surrender Units, etc
 52 Adoption units
 56 Stray/Healthy Hold units
3 Cruelty Hold units
 141 dogs

NOTE: Split between kitten and puppy count is recommended but it is not included in the calculations above.

Prep/Treatment Room: 650 SF

- Description:** The Prep/Treatment is where the Vet and Clinic Technicians prep patients for surgery, treat and examine animals, and occasionally give baths.
- Space needs:** Locate adjacent to: **Clinic Animal Maintenance Room – 130 SF, Clinic Laundry – 40 SF, Medical Gas Storage Room – 60 SF**
- Adjacencies:** All clinic functions
- Wall Finishes:** TBD
- Flooring:** Seamless flooring
- Ceiling:** Suspended acoustical ceiling system
- Doors:** Single 36”x84” hollow metal door with hollow metal frame with window to all functions; Single double acting plastic door with plastic frame between surgery and prep room with full lite; provide staff entrance door for clinic staff
- Windows:** Provide visual connections to surgery and animal holding rooms
- Hardware:** Not applicable
- Security:** Not applicable
- Electrical:** power bar over backsplash for lab area
- Plumbing:** Provide deep stainless steel (s.s.) sink with goose neck faucet; 2 connections for prep tables (refer to equipment selection); provide recessed keyed hose bib connection; s.s. floor drains; surgical scrub sink with knee or foot controls
- HVAC:** Discussed in a separate section
- Millwork:** Provide solid surface counter tops with laminated base cabinets and upper cabinets. All exposed surfaces to be laminate or melamine finish, no exposed wood/composite material allowed. All base cabinets should be mounted on to a 4” concrete pedestal
- Equipment:** Hydraulic powered, with integral scale adjustable height exam table (1)
Tie ups for leashes at different heights located next to exam tables (3 at each location)
S.S. tub table with knee space and 3 drawers and 1 door (1)
S.S. treatment table with knee space and 3 drawers and 1 door (2)
Under counter refrigerator (1)
Large residential stackable washer/dryer unit (1 pair in Clinic Laundry)
S.S. pass-thru cabinet between surgery and prep w/ glass doors (1)
Central vacuum system
Medical gas distribution and manifold system w/ Iso-Fluorine

Room Requirements (Example)

Medical gas recovery scavenger system
PC workstations with access to main digital x-ray system (Clinic technician's stations may serve this purpose depending on location)
S.S. grooming tub with retractable ramp (1 in animal maintenance room)
Dental station (1 in clinic animal maintenance room)
S.S. Rolling cart with shelves (1)
S.S. Surgical supply storage cabinet w/ solid doors (1)

Furniture: Keyboard tray (2 at workstations)
Rolling / height adjustable stools (3)

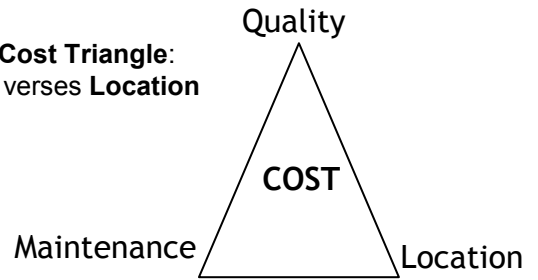
Special comments:



Materials and Equipment

Professional Animal Shelter Design and Construction
Richard S. Bacon, AIA, LEED® AP BD+C, CGC, Bacon Group, Inc.

When choosing materials remember the **Cost Triangle:**
Quality versus **Maintenance** versus **Location**



Cost Scale: \$ = least expensive to \$\$\$\$ = most expensive
SF = Square Foot; SY = Square Yard

1 square foot is 0.09290304 square meter.
1 square meter is 10.76391 square feet.
1 square yard is 0.8361274 square meters.
1 square meter is 1.19599 square yards.

Search for or visit the manufacturer's website, if listed, to determine if they distribute to Asian markets.

Flooring Materials

Vinyl Composition Tile

- Cost Per SF: \$
- Suppliers: Armstrong, Azrock and Tarkett.(see below)

Sheet Vinyl

- Cost Per SF: (Can vary from reasonable to astronomical) \$\$ - \$\$\$\$
- Suppliers: Armstrong (www.armstrong.com.tw)
Forbo, Marmoleum (www.forbo.com.cn)
Tarkett Granit Acoustiflor (www.tarkett-commercial.com/cn/)
Mondo Flooring (www.mondoworldwide.com/index_eu_ch.cfm)

Porcelain Tile

- Cost Per Square Foot: \$\$\$
- Suppliers:
Dal-Tile Corporation (www.daltile.com)
American Olean Tile Co. (www.americanolean.com)
StonePeak Ceramics (www.stonepeakceramics.com)

Quarry Tile

- Cost Per SF : \$\$
- Suppliers: American Olean, Dal-Tile Corporation, Lafaenza, Florida Tile, and Buchtal

Ceramic Tile

- Cost Per SF: \$\$
- Suppliers: American Olean, Dal Tile, Lafaenza, Florida Tile, and Buchtal, StonePeak Ceramics, among others

Grouts

- Cost Per SF: \$ - \$\$
- Suppliers: Latapoxy SP100 Epoxy Grout, Laticrete Adhesive #4237, and Mapei Karapoxy (www.laticrete.com.cn/)

Resinous Flooring

- Cost Per SF: \$\$\$
- Suppliers:
Sica Corp. (<http://www.sika.cn/>)
Stonhard (www.stonhard.com) Dur-a-flex, (www.dur-a-flex.com)
Dex-O-Tex, Cheminert, Neotex (www.dexotex.com)

Kennel / Cages / Condo, Dog & Cat Housing Materials

Flooring Materials

Resinous Flooring (See above)

Concrete Sealers, Colors and Hardeners

Integrally colored concrete:

Suppliers:

True Tone Cement Colors (Davis Colors)

Solomon Grind (Chemical Service)

Nonmetallic Grit:

Supplier: The Burke Company

Dry Shake, Nonmetallic Hardeners:

Suppliers:

Dry Shake (Sonneborn)

Colorcron (Master Builders)

Tnemec

Acid Staining, Supplier: L.M. Scoffield

Wall Materials

Structural Glazed Tile or Structural Glazed Brick

• Suppliers:

Elgin-Butler

Astra-Glaze (Trenwyth Industries), Emigsville, PA

Hanley Brick, Summerville, PA

Spectra Glaze, the Burns and Russell Company

Fiber Glass Wall Board or Solid Phenolic Panels

• Suppliers:

WilsonArt Solid Phenolic Core Panels

Glasboard (Crane Composites)

Glasboard (Kemlite)

Dipcraft MFG (Braddock, PA)

Earth Science

Glass Block Walls

• Suppliers: Pittsburgh Corning and Altemp Co. (Amiran)

Cages and Modular Kennel Systems

• Manufacturers and Suppliers:

Mason Co. (800/543-5567, www.masonco.com. Asian-Pacific distributor www.therian.com.au/)

Shor-line / Schroer Manufacturing (800/444-1579, www.Shor-line.com)

Clark Cages (800/461-9972, www.clarkcages.com)

LGL Animal Care Products (979/775-1776, www.lglacp.com)

Snyder Manufacturing (800/422-1932, www.snydermfg.com)

Suburban Surgical Company (800/323-7366, www.suburban-surgical.com)

T Kennel System (800/377-7103, www.t-kennel.com)

The Cat's Inn (877/228-7466, www.thecatsinn.com)

Tri-star Metals, Inc. (877/459-7827, www.tristarvet.com)

VSSI Kennels (800/299-9525, www.vssi.com)

Companion Habitats (pocket pets, reptiles, etc. (888/831-1226, www.companionhabitats.com)

Houndquarters (custom dog doors) (602/995-2420, www.houndquarters.com)

Cat Fence-In (888/738-9099, www.catfencein.com)

PurrfectFence (888/280-4066, www.PurrfectFence.com)

• There are others; get a copy of The Humane Society of the U.S. (HSUS) *Shelter Pages* catalog.

Acoustical Materials

Sound Block

- Cost Per SF: \$\$ - \$\$\$

Acoustical Decks

- Most deck manufacturers fabricate decking

Acoustical Plasters

- Cost Per SF: \$\$\$
- Manufacturers:
 - Pyrok
 - 3-M acoustical spray

Sound Absorbing Wall Panels

- Cost Per SY: \$\$
- Suppliers: Soundsoak (Armstrong)
Softscape, Capaul, Acoustiflex Corp.

Sound Stop Fiberboard

- Cost Per SY: \$\$
- Suppliers: Knight - Celotex (866/850-8836, www.knightcelotex.com)

Paints/Coatings

Epoxy Paint:

- Cost Per SF: \$
- Supplier:
 - Tile & Epoxy Coating
 - Porter International
 - Tile Clad II (Sherwin Williams)
 - Try-Glaze 4, Gloss or Semi-Gloss (Moore)

Acoustical Paints:

- Latex Acoustical Ceiling and Wall Paint with ceramic micro-spheres and special sound absorbing filters AND additives that can be mixed with regular paint
- Manufacturer: Hy-Tech Thermal Solutions (www.ceramicadditive.com)

Ceiling Finishes

Painted Drywall

Suspended Acoustical Tile

- Cost Per SF: \$1.00, or more if patterned.
- Suppliers: Armstrong, US Gypsum Company, Owens Corning, Celotex

Special Systems or Equipment

Floor Drains Systems

Flushing Floor Drains:

The Sani-Cepto R-type flushing floor drain is the most commonly used drain. It is 14 inches in diameter with a hinged, perforated grate cover. The inside of the drain is porcelain enamel. The important benefit of this drain is that it can be flushed from controls on the wall so solids can be forced out of the system, which includes out of the P-trap.

Trench Drains:

Hydraulic Trench Systems, such as those from ACO Polymer Products (800/543-4764) or Polydrain Trench Drain System (800/438-6057), have been used successfully in canine runs. These can be installed for each individual run so cross-contamination is eliminated.

Individual Kennel Drains:

Separate drains in each run are an alternative that reduces the chance of cross-contamination and eliminates the mechanical parts of the above system. Six-inch diameter drains are the smallest indicated unless ALL solids are to be collected before washing the run; with a solid-removal program, four-inch drains are usually adequate. A drawback is the staff washes toward one small target.

Drain Covers:

Materials include plastics to stainless steel with stainless preferred.

Plantings

Don't forget plantings; they add color, help with acoustics and scale, and provide comfort for animals and people.

Incinerators & Crematoriums

- Cost: U.S. \$15,000 and up installed.
- Suppliers:
 - B&L Cremation Systems (800/622-5411 www.blcremationsystems.com)
 - BlueDiamond by Onex (800/282-6639, www.animalcrematories.com)
 - Crawford Equipment & Engineering (800/228-0884, www.crawfordequipment.com)
 - Matthews Cremation Division (800/327-2831, www.matthewscremation.com)
 - Shenandoah Manufacturing (800/704-7356, www.shenmfg.com)
 - Therm-tec (800/292-9163, www.thermtec.com)
- Note: Do not forget: most of these vendors will guarantee local environmental clearance as part of the sale. Make them put the guarantee in writing!

Glass/windows/store-front systems

Adds more light, opens facility and allows viewing of pet care areas, surgery, grooming, boarding, etc.

Corner Guards

- Suppliers: Acrovyn, Construction Specialties, Inc. (www.c-sgroup.com) Tepromark, Tepromark International (Taiwan served by Hong Kong office www.c-sgroup.com/sales-locations/country)

Notes:

1. **As with all such information, manufacturer's names, phone numbers and prices are guaranteed to change!**
2. **Many of the products listed here are used for our environmental and sustainable design projects; however, this is not a "green" list of materials.**

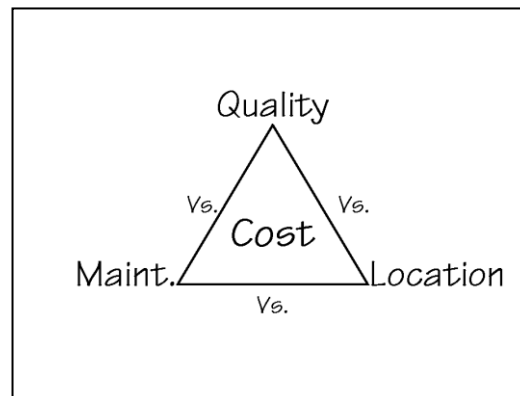
Flooring Materials

By Richard S. Bacon, AIA, LEED-AP BD+C, CGC

A wide variety of flooring materials is available for use in animal housing facilities. Different finishes include sealed concrete, tile, seamless coating systems, sheet vinyl, vinyl composition tile (VCT), and terrazzo.

The trick is to know when and where to use different floor finishes. It is important to ask yourself some basic questions before deciding which floor finish to use.

- *Is the floor installation part of a new construction project or is it a renovation and replacement?* New construction always allows greater flexibility and the opportunity to do it correctly the first time. Replacing a floor because the old system is worn out or has failed requires an evaluation of how well the original floor finish performed or what might have caused it to fail.
- *What activity will take place in the area?* Floors in animal housing areas need to withstand harsh chemicals and frequent, deep cleaning. Flooring in a reception area will need to stand up to lots of foot (and paw) traffic, but it is unlikely that you will clean it with a high pressure water hose. Durability, initial cost, and attractiveness are characteristics for flooring in public areas while durability and cleanliness rule in animal housing areas.
- *What is your budget?* Use the "cost triangle" to help you determine a budget and **location** for materials. Better **quality** usually means higher up-front **cost**. Saving money up-front by choosing a material that is less expensive to install is often offset by higher **maintenance costs** over the long term.



Tile flooring is good for lobbies, corridors, wet rooms and restrooms. Among the tile family, porcelain tile is the most expensive. One benefit of porcelain is the color goes all the way through the tile as opposed to a glazed ceramic tile where the color is on the top. A chip in porcelain tile will not be as noticeable. We recommend using epoxy, stain-resistant grout in a darker color that does not show dirt easily. Sealing the grout joints will help the floor look better longer.

Vinyl flooring comes in a vinyl composition tile (VCT) or as sheet vinyl. Vinyl is available in lots of colors and patterns and is a good, all-around material to use for general flooring in reception areas, offices, staff areas, corridors and other places that will not be wet on a regular basis. Because VCT is a tile, it has joints that require regular cleaning. Sheet vinyl offers a relatively seamless floor and can be anti-microbial. It is also good for general use, laundry and groom rooms, and similar areas especially if a commercial, stain resistant grade is used. The seams need to be chemically or heat-sealed, however, problems may occur with separation of the cove base in corners.

A seamless coating system, or resinous flooring, is a two-or-three step trowel-applied epoxy or elastomeric resin flooring system that requires an experienced installer. Its per-square foot cost is comparable to high quality porcelain tile. Surface preparation of the underlying concrete slab is critical or the resinous flooring system will fail. When installed correctly, a resinous flooring system should last for years, retain its color, and provide a seamless and jointless floor surface that does not harbor dirt and bacteria. It is good for wet and animal housing areas.

Advances in concrete design offer some of the most exciting and affordable flooring ideas. Concrete can be integrally colored, acid stained or have a color applied during curing. We are seeing more colored concrete floors being used in kennels and animal shelters because concrete is a cost effective alternative to resinous floor and tile. The design advantages include good quality, durable surfaces and attractive use of color. Concrete floors have seams, so the floors need to be sealed initially and resealed every few years.

Which type of flooring to use and where to put it are among the most critical design decisions an owner will make. Well-maintained and clean floors are one of the attributes of an attractive animal shelter and of a profitable board facility. Using quality materials and experienced installers can make a huge difference in how long the floor lasts and your level of satisfaction.

Richard S. Bacon, AIA is president of Bacon Group, Inc., an architecture and engineering firm with design expertise in animal shelters, animal boarding facilities, and veterinary hospitals. He is a registered architect in 21 states, holds a registration certificate from the National Council of Architectural Registration Boards (NCARB), is accredited in sustainable design for new buildings and construction by the U.S. Green Building Council, and is a licensed General Contractor in the State of Florida. This article has appeared in *NACA News*, a bi-monthly magazine of the National Animal Control Association, *Pet Services Journal*, the bi-monthly journal for Pet Care Services Association members, and in *FACA Trax*, the quarterly newsletter of the Florida Animal Control Association. For more information about Bacon Group contact us at 800-961-1967 or visit www.BGArchitects.com.

參考資料七：建築承包商之評估

This form is a template for a written or telephone reference check for a construction contractor you are considering for your animal shelter construction project.

(Insert the CONTRACTOR'S NAME here) Reference Check
(Insert your PROJECT NAME and ORGANIZATION NAME here)

Name of Reference: _____

Date: _____

1. Did the contractor meet the construction schedule? If not, was the reason due to the architect or owner or contractor and what caused the delay?

2. Were there any change orders during construction? If so, what was the basis of the change order(s)?

3. Were there any problems with the project that the contractor was responsible for causing?

4. Were there any warranty issues that the contractor failed to take care of?

5. Would you hire the contractor again? If yes, why? If not, why not?

Signature of person checking reference: _____

Please return this reference to: (Insert your name and address here). Thank you.

Construction Project Phasing

By Richard S. Bacon, AIA, LEED-AP BD+C, CGC

Thinking logistically is required when you are planning a construction project. Construction phasing is one area where forethought is a must if you intend on using your animal shelter during the construction process.

Construction phasing has two basic meanings. The first is to design a facility so the building can be expanded when additional funding becomes available. An example is having funds to build two kennel wings holding 25 dogs per wing now and a third wing for 25 dogs in two years when more money becomes available. Another example is when a Master Plan is developed to add a low-cost spay/neuter clinic in the future because the need is there, but funds don't allow for the construction at the current time.

The second aspect of phasing is planning for construction when the building is occupied. This second aspect is the main focus of this article. Frequently, this type of construction phasing is used for renovations and additions or renovations only.

Begin with a Plan

Every project we start begins with a careful discussion about scope and budget. The client/user must be clear whether the scope of the project will dictate the budget or the budget will dictate the scope of the project. The combined scope of the work and budget defines the total project goals.

The architect and client/user must first establish a detailed program which defines all spaces, function of those spaces, and the relationship of those spaces to each other. A simple example of this is a project to add a space for 25 large-dog holding units, which equates to a room approximately 1,000 square feet, and it needs to be located adjacent to the lobby. When all of the rooms are determined, then a plan can be developed that not only locates the spaces properly but takes into consideration what must be renovated first to keep the facility operational, what can be renovated second, and so on.

Mechanical, Electrical, Plumbing and Fire Protection (MEP&F) Systems

Almost every renovation / addition project involves the mechanical, electrical, plumbing and fire protection (MEP&F) systems in some facet. In some cases, work on these infrastructure systems is the project. Phasing is a key logistical concern for most of these cases when the systems must be removed and replaced, which means that work will be performed in occupied spaces or spaces that must be vacated for an undetermined period of time.

There is also a critical moment when the contractor must switch from the old system to the new system. An example is when a new mechanical system has been provided that includes a chiller. At some time the contractor must transfer operations from the old chiller to the new chiller and that means down-time for the heating, ventilation, air conditioning (HVAC) system. The same is true for the electrical system. Should a new electrical service be installed, there will be a change-over from the old to the new. Phasing of the work will allow for a smooth transition.

Fire Codes

Another aspect of phased construction planning is the consideration of fire rated construction both existing and new. The architect must continue the fire code integrity of the facility during construction and after. Existing fire walls that will be removed or penetrated must be phased as the building remains occupied.

During phased construction, the means of egress must also be maintained. If a stairway or corridor is to be moved or impeded during construction or at the completion of a specific phase, a secondary or temporary means of egress must be planned.

Work During Odd Hours

In the retail business, such as banking for example, it is common for renovation work to occur at night or over a weekend. Some businesses completely close-down for a week so work can be accomplished quickly. Installing new floors, re-painting interiors, or replacing or re-laminating counters and cabinets work well with these odd schedules.

There are contractors who specialize in these types of compressed schedules and you will usually have to pay a premium for the service. However, it may be worth the money when you consider the disruption to your operations when the work is all done during your hours of operations.

Other Shelter Resources and Virtual Tours of Shelters

University of California Davis Veterinary Medicine Koret Shelter Medicine Program Website

<http://www.sheltermedicine.com/>

<http://www.sheltermedicine.com/shelter-health-portal/information-sheets/facility-design-and-animal-housing>

University of Florida Maddie's Shelter Medicine Program

<http://www.ufsheltermedicine.com/shelterResources.html>

Cornell University College of Veterinary Medicine Maddie's Shelter Medicine Program

<http://www.sheltermedicine.vet.cornell.edu/>

Association of Shelter Veterinarians

Guidelines for Standards of Care in Animal Shelters (published in 2010)

<http://www.sheltervet.org/>

The Humane Society of the United States Animal Sheltering Resource Library has lots of information about shelter design

http://www.animalsheltering.org/resource_library/

ASPCA Professional

<http://www.aspcapro.org/about-us.php>

Maddie's Fund (look for Resources tab)

<http://www.maddiesfund.org/>

Virtual Tours of Shelters

Montgomery County Animal Resource Center in Dayton, Ohio

<http://www.mcoho.org/services/arc/tour/index.cfm>

Oregon Humane Society in Portland, Oregon

<http://www.emilive.com/portals/101/tour/1810/0.html>

Pasco County Animal Services in Land O'Lakes, Florida

http://portal.pascocountyfl.net/portal/server.pt/community/animal_services/223

Shelby Humane Society Shelter Makeover (From the www.aspcapro.org site)

<http://www.aspcapro.org/creating-healthy-spaces-for-animals.php>

<http://aspcapro.articulate-online.com/p/0574655035/DocumentViewRouter.ashx?Cust=05746&DocumentID=b0750145-78ad-46a1-81da-b7f3766c86f6&Popped=True&InitialPage=engage.html>

動物收容所環境中的噪音： 建築設計及每日受到噪音干擾的效應

Crista L. Coppola

動物行為中心，ASPCA，伊利諾州

R. Mark Enns and Temple Grandin 動物科學系，科羅拉多州立大學

JOURNAL OF APPLIED ANIMAL WELFARE SCIENCE, 9(1), 1-7 (應用動物福利科學期刊)

翻譯：林仁惠

校對：江玉婷、朱增宏

動物收容所內的噪音通常都在 100 分貝以上。噪音是造成動物行為、生理及組織反應的壓力源，然而，目前卻沒有任何政策規範可管制狗舍中的噪音量。這份研究的目的旨在評估動物收容所內犬隻持續感受的噪音量，以決定是否需要建立噪音規範。新建動物收容所在所有室內犬隻留置區都會安裝一個噪音測定器，這些區域包括：大型犬認養區和收容區、小型犬認養區和收容區，及新進動物點收區。結果發現，大型犬認養區的噪音量最高，並且會影響到其他房間，最高時通常都會超過噪音測定器的極限（118.9 分貝）。即使證據顯示出，噪音會導致犬隻在生理及心理上的壓力，新建收容所的設計仍然很少注意到應降低噪音量。欄舍的設計也必須顧及舒適合宜的音量範圍，以滿足犬隻行為及生理需求。

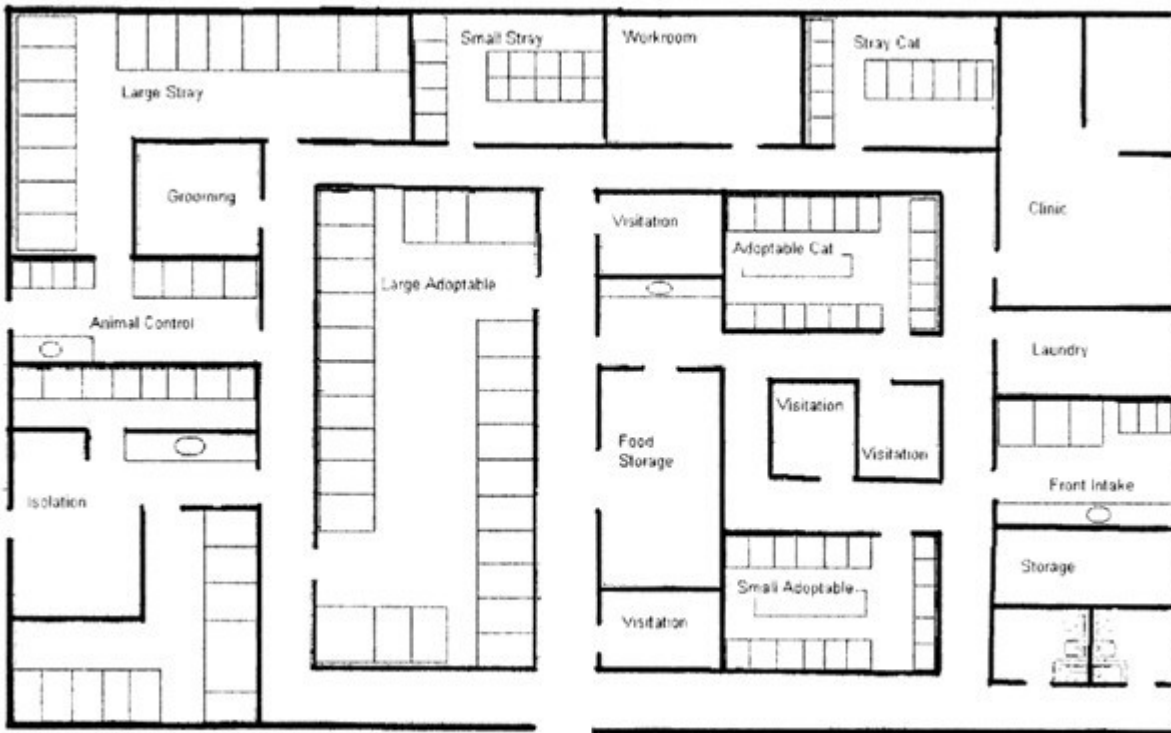
動物收容所的噪音已有相關文獻提出討論(Key, 2000; Milligan, Sales, & Khirnykh, 1993; Sales, Hubrecht, Peyvandi, Milligan, & Shield, 1997)，Sales 等人也發現噪音量通常超過 100 分貝，而音量的衡量是以 10 倍的分貝函數計算，亦即 90 分貝的音量是 80 分貝的 10 倍，也就是 70 分貝的 100 倍。超過 70 分貝的音量就已經算是「大聲」(Baker, 1998)。95 分貝大約是地鐵車行的音量，110 分貝就如同一台鑿岩機，而 120 分貝更達到螺旋槳飛機的程度。任何在 90 至 120 分貝間的音量都被視為「危險區」，不僅聽的到，也感覺的到(Key, 2000)。然而，卻沒有一個單一方法或流程用來衡量職業噪音。噪音音量時高時低、斷斷續續，且包含了狗叫聲之類的突發噪音時，較適合用噪音測定器測量。使用噪音測定器時的一個考量是，將麥克風置於被監測個體的聽力可及範圍內。

研究早已證實，音量對非人類動物的生理及心理會造成極大的影響，並干擾體內的健康平衡(Wei, 1969)。噪音是造成動物行為、生理及組織反應的壓力源，噪音所導致的皮質醇增加會抑制免疫力，引發抗胰島素、心血管疾病、新陳代謝及消化器官等問題(Spreng, 2000)。動物的聽覺與人類不同，犬隻甚至聽得到比人類所能聽見最細微音量小四倍的聲音。近期的研究顯示，犬舍中的噪音可能會是動物福利問題(Sales et al., 1997)，然而目前沒有任何政策規範犬舍中的噪音度。

本研究旨在評估動物收容所內犬隻持續感受的噪音量，以決定是否需要建立噪音規範。規範可強調必須藉由建築設計及建材以降低動物產生之噪音，而非試圖讓動物減少發出聲音。這份報告的調查對象都是近七年來建構的收容所，然而，常見的情形是這些設施在設計上都缺乏顯著的預防措施以降低噪音，實際上，某些設計會因水泥磚塊的使用、暴露在外的金屬屋頂，及不良的動物安置等，而造成反效果。

材料及方法

針對一所 1999 年建造的動物收容所進行噪音音量的測量。收容內有五處犬隻留置區域及兩處貓咪留置區。在所有戶內的犬隻留置區監測，範圍包括大型犬認養區、收容區、小型犬認養區、收容區，及新進動物點收區（如圖一），以噪音測定器對周間兩日及週末連續監測 84 小時。每個房間的牆上都裝設了噪音測定器，牆面都是非滲透性的材質，可反射動物所感覺的震動並加以測量。雖然每個房間裡的測定器與犬隻遠近位置的距離並不相同，但都在其能聽到的範圍內，所以測量出來的結果可反映出該區所有動物所經歷的音效。所得結果顯示出緩慢回應的最大值及衡量度 A。這種量表及量度普遍使用於工作環境的監測以落實「職業安全及健康署」（OSHA）的規範。



圖一：收容所的圖示（66 英尺 x 120 英尺）

大型犬認養區及收容區的牆面，都是由表面塗上環氧樹脂的空心磚砌成，地面是以平滑無縫的混凝土鋪設。兩區的狗舍都以 82 英尺的水泥隔間及金屬網門隔開，天花板也都是高於 20 英尺的開放式鋼製天花板，噪音測定器就裝設在牆上 12 英尺高的位置。

大型犬認養區是一個大空間內的小空間，以 82 英尺的水泥隔牆圍起來。大房間有 2 個走道、8 個門通往包括大型犬收容區及小型犬認養區等其他區域，及一個通往外面的大門。這個房間內有 26 間狗舍，一端是可透視的樹脂玻璃，狗舍的排列設計沿著四面牆壁，房間中央有員工工作區（準備食物及清洗餐具）。大型犬收容區則在隔壁房間，有 2 個門及 15 間狗舍，狗舍則沿著南側及東側牆壁排列。

小型犬認養區、收容區及新進動物點收區都是獨立的空間，有懸吊式、不具吸音功能的瓷磚天花板(8 英尺)及石膏板牆面，噪音測定器就安裝在各房間牆面上約七英尺高的位置。

小型犬認養區及收容區都各有一扇門、混凝土地板及金屬狗籠，小型犬認養區的狗籠面向房間內部，外部則裝設樹脂玻璃，房間中央有員工工作區。小型狗收容區的狗籠有的沿著牆壁，也有一排置於房間中央。新進動物點收區內的狗籠及狗舍則是以 60 英吋高的金屬板隔開，油氈地，狗籠及狗舍都沿著南側牆面排列。房間內也配備冰箱，每區內都有裝設了洗手槽的工作檯面和櫥櫃等。研究期間內狗舍數目及動物的平均數量如表一。

表一：動物留置區域及犬舍數量概述

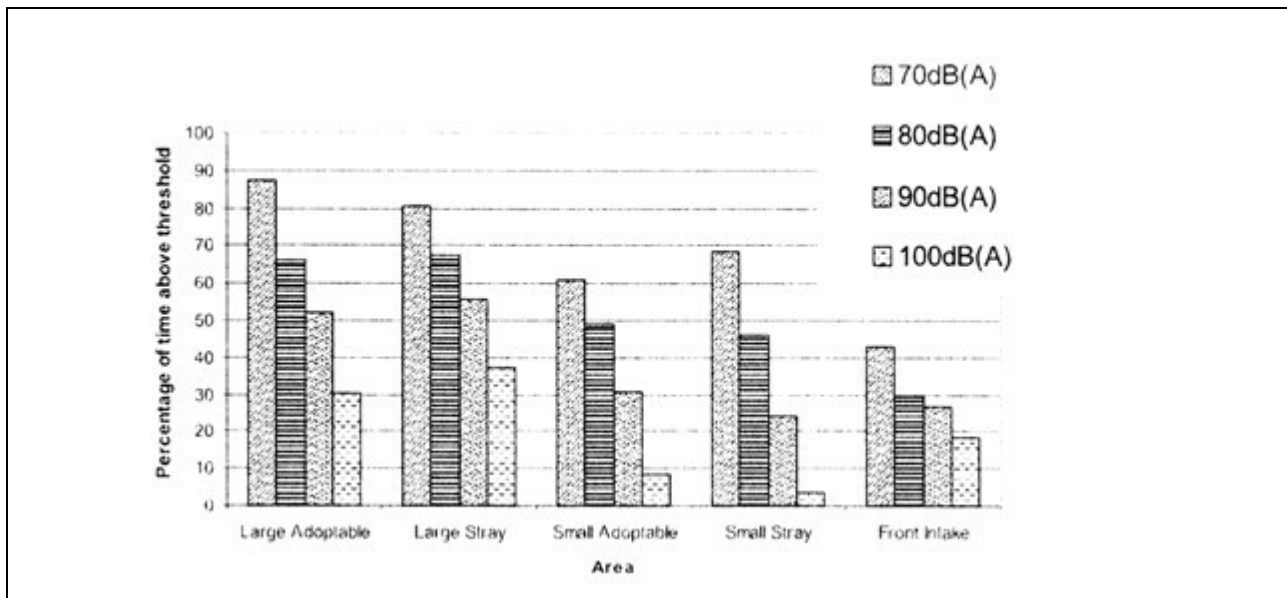
留置區	動物平均數量	狗舍數量	面積 (平方英尺)
大型可認養	34.25 dogs	26 runs 間	880
大型收容	15 dogs	15 runs 間	485
小型可認養	9.8 dogs	28 cages 籠	285
小型收容	9 dogs	17 cages 籠	258
新進動物點收	4 dogs, 9.75 cats	4 runs 間, 4 cages 籠	240

數據分析

噪音值的分析是依據頻率流程準則 (SAS Institute Inc., 2002) 來測量每間犬隻留置區內高於或低於每個臨界值 (70, 80, 90, 100 分貝) 的噪音頻率。這些資料也以 Genmod 流程準則 (SAS Institute Inc., 2002) 加以分析，測量各別臨界值 (70, 80, 90, 100 分貝) 的噪音頻率在五個留置區之間是否有明顯的差異。每區域都被視為效應固定、等級變換的重複對象。這項分析適用於呈現出統計學上二元分布 (binary distribution) 及自相關共變異數成長曲線結構 (auto-regressive covariance structure) 的結果，可用來解釋同一房間內不同測量值間的關係。

結果

圖 2 所示為研究進行的 84 小時內，音量高於各臨界值的時間。大型犬認養區的音量不但明顯大於其他區域，其他房間測得的某些數值甚至有部分是來自大型犬認養區的回音。大型犬認養區的最大音量經常超過噪音測定器的測量極限 (118.9 分貝)。當犬隻安靜下來且房間「看似」安靜時，噪音指數仍可達 50、60 分貝以上。每個房間測得的數值雖然不一，各個臨界值卻沒有統計學上的差異 ($p > .05$)。



研究期間在各區（大型犬認養區、大型犬收容區、小型犬認養區、小型犬收容區、新進動物點收區）測量到高於各臨界值(70、80、90及100分貝)的時間比例

討論

遺憾的是，即使證據顯示噪音造成犬隻生理及心理的壓力，消除噪音壓力源的重要性仍常被漠視。在我們的研究中，動物隻數最多的大型犬認養區會產生最高的噪音值，其實是意料中事。此區有大量來認養犬隻的訪客出入其間。雖然無法測試，但在運作正常的收容所內，我們懷疑這區的噪音會逸散到其他區域。大型犬認養區周邊的走道構成傳導噪音至其他區域的音廊（圖一）。此外，單一犬隻的吠聲即可造成100分貝以上的噪音(Sales, Hubrecht, Peyvandi, Milligan, & Shield, 1996)，超過了OSHA規範的人員安全值（90分貝）。人類有能力採取某些聽力保護措施，生活在這種環境中的動物卻未受到任何保護。噪音所造成的效應分成三個層面：

1. 收容所裡的動物
2. 收容所內的工作人員
3. 前來認養動物的民眾

動物的心理及生理狀況都會受到負面影響。員工除了聽力可能受損，對動物的照護也可能有所疏漏。我們也觀察到，訪客有時會因不堪噪音干擾而縮短參觀時間。

大型犬認養區的設計讓每隻狗都可以從犬舍門板看到其他的狗。工作區也設置在長方形房間的中央，形成額外的刺激源。根據觀察，這樣的空間配置會對狗產生經常性的刺激、增加吠叫頻率，因為區內的任何活動都會刺激到每隻狗。結果就是經常性的吠叫。

這棟建築物不論是設計或建材都沒有吸音效果，除了有懸吊式天花板的房間以外（小型犬收容區、小型犬認養區及新進動物點收區）。懸吊式天花板的吸音效果雖可稍微降低噪音量，實質上卻沒有太大差異。此外，現有的民眾參觀方式也對犬隻造成了額外干擾。探視窗裝設的位置和犬舍間的隔板設計，造成犬隻時常因為經過的人突然出現在視線內而受到驚嚇。

在收容所環境內，動物體內皮質醇的數值都高於正常值，有時更高達寵物的三倍以上(Hennessey, Davis, Williams, Mellott, & Douglas, 1997)，這個案例也不例外(Coppola, Grandin, & Enns, 2006)。雖然壓力誘發皮質醇升高的現象不能完全歸咎於噪音音量，但噪音的確是其中一個作用因素。

一種漸趨流行的犬舍設計方式是將傳統式的犬舍改成獨立的房間，這些房間通常位於一個可能設有公共遊戲區的較大空間內。噪音會被吸收並隔絕在小房間內。這種設計也可提供犬隻以社群方式居住的空間，研究顯示可減少動物吠叫所造成的噪音，並增加動物的睡眠時間(Hetts, Clark, Calpin, Arnold, & Mateo, 1992; Mertens & Unshelm, 1996)。將群體遊戲區納入有助於減低噪音，因為生理及心理的活動皆可使犬隻趨於鎮靜(personal communication, November 17, 2005; San Francisco Society for the Prevention of Cruelty to Animals, American Society for the Prevention of Cruelty to Animals, Humane Society at Lollypop Farm, Denver Dumb Friends League, North Shore Animal League)。位於紐約的 ASPCA 最近採用這種新設計觀念，重新裝潢了其收容及認養區域，而位於舊金山的 ASPCA 則自 1998 年就將其可認養犬隻的房舍改裝成這種「公寓式」的空間。

動物福利的意義

如同以往的科學家所言，犬舍的設計必須能滿足犬隻行為及生理需求，設計上必須也顧及舒適合宜的音量範圍(Key, 2000; Sales et al., 1997; Sales, Milligan, & Khirnykh, 1993)。遺憾的是，即使在新的犬舍建築中，因為成本限制，減低噪音的設計仍經常被忽略，使得噪音對動物、員工及可能的認養人都造成危害。因其不可預測及不可控制的性質，對犬隻而言，收容所是一個充滿壓力的環境，因此，應該盡可能採取任何可減少或消除壓力來源的作法。如果我們依循人類居住環境的標準，動物居所應保持在平均 45 分貝的音量才算正常，然而，在沒有任何法規可規範動物收容所內噪音音量的情況下，噪音仍然是一個被忽視的變數，減損了整體的動物福利。

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「專業動物收容所設計與建築」工作坊

會前提問

1. (1)有無國外專業收容所的建築與管理的影片，或照片
(2)專業收容所的空間設計為何？如何防止狗的叫聲？
2. 因為關心動物的生存處境，所以想要瞭解先行者如何處理相關問題—於硬體、以及軟體。
3. (1)動物餵食方式？（人工 or 設置餵食／供水系統）
(2)汗水處理方式及再利用為何？
4. (1)約 2 坪的地方，欲收容 30-40 隻貓，要如何設計？
(2)約 4 坪的地方，欲收容 40-50 隻幼犬或小型犬，要如何設計？
(3)收容哺乳犬的設施？
(4)即使是兇的狗，不用捕犬桿，也能完成疫苗注射、照像及進入狗籠的作業？
5. 鑑於現在社會上有許多的流浪動物是由於一時興起而飼養為寵物，但是在飼養一段時間後發現自己無法負擔其生活所需以及醫療上的照護，因而將之遺棄，若是有機會的話有沒有可能發展出另一套類似於健保之類的動物保護法，以適應現代因為經濟因素日趨嚴重的遺棄問題。