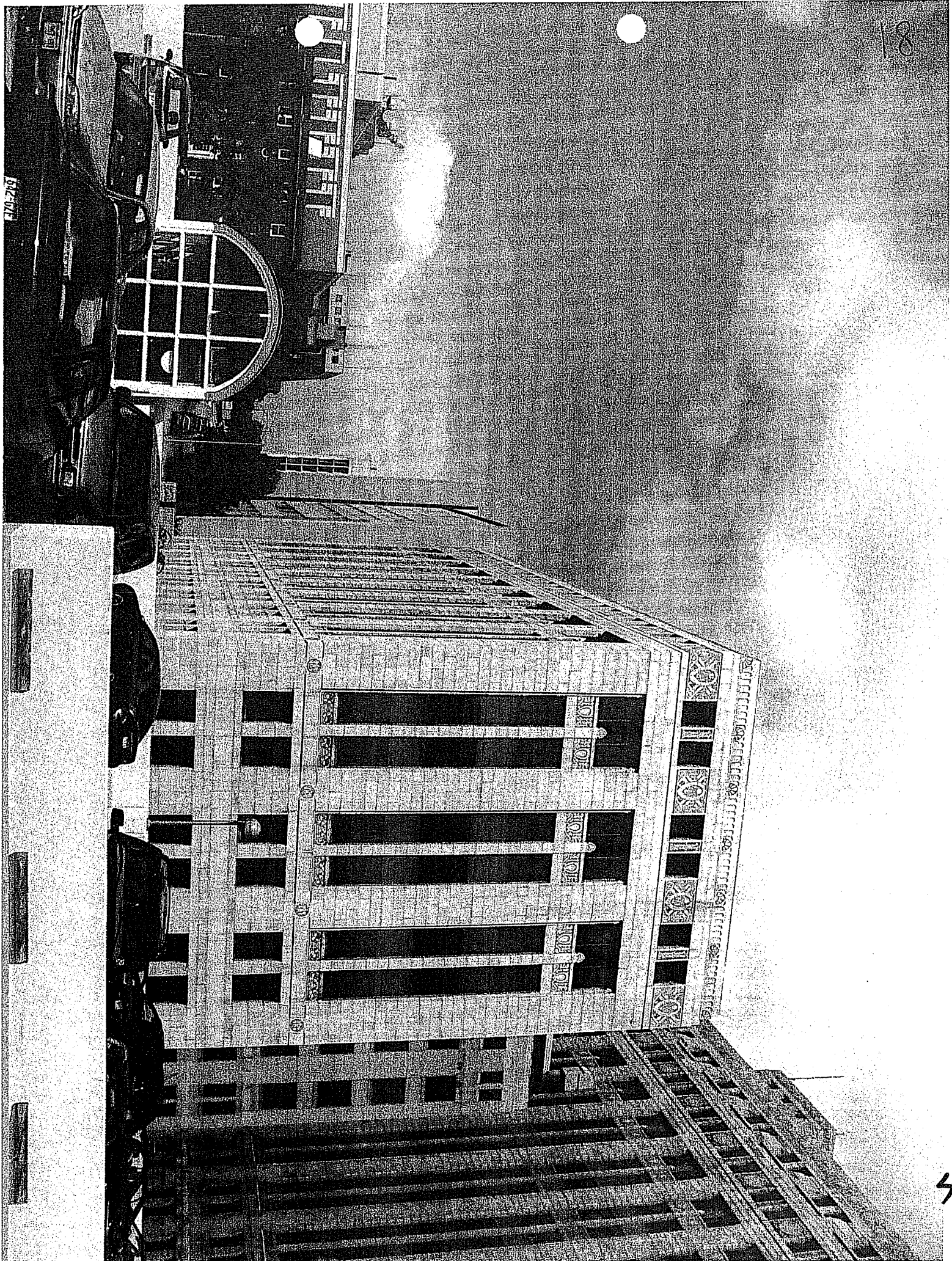
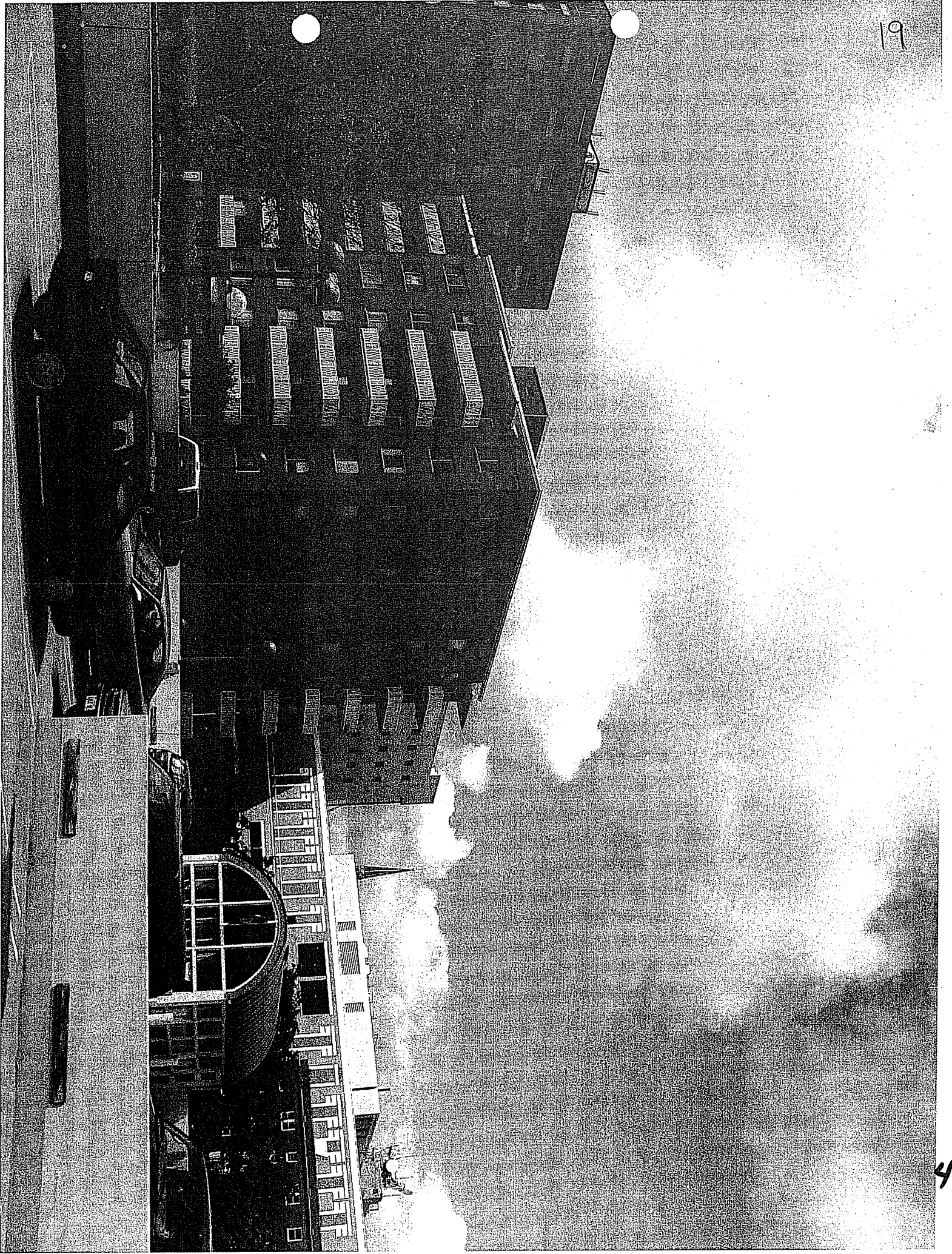
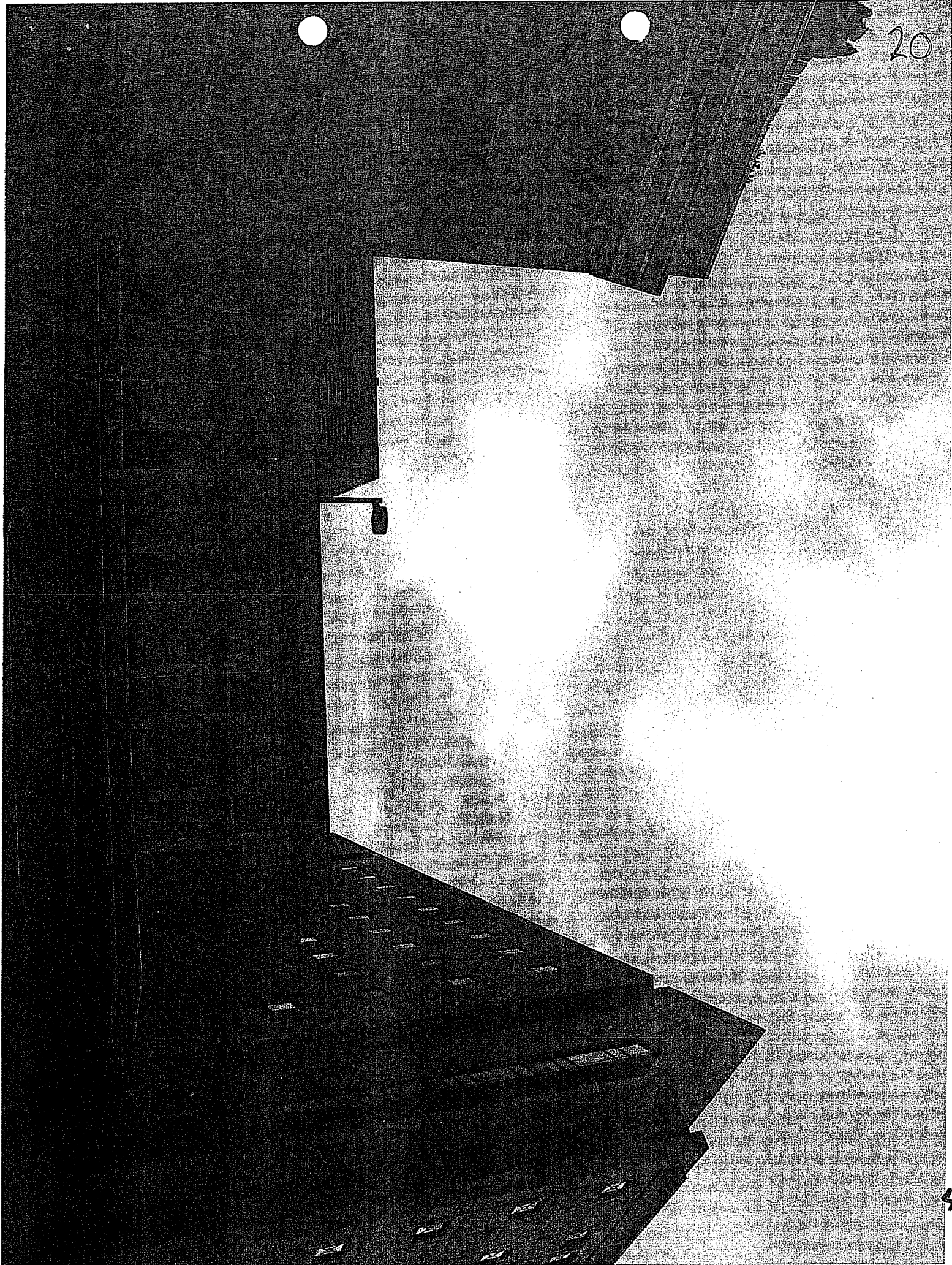


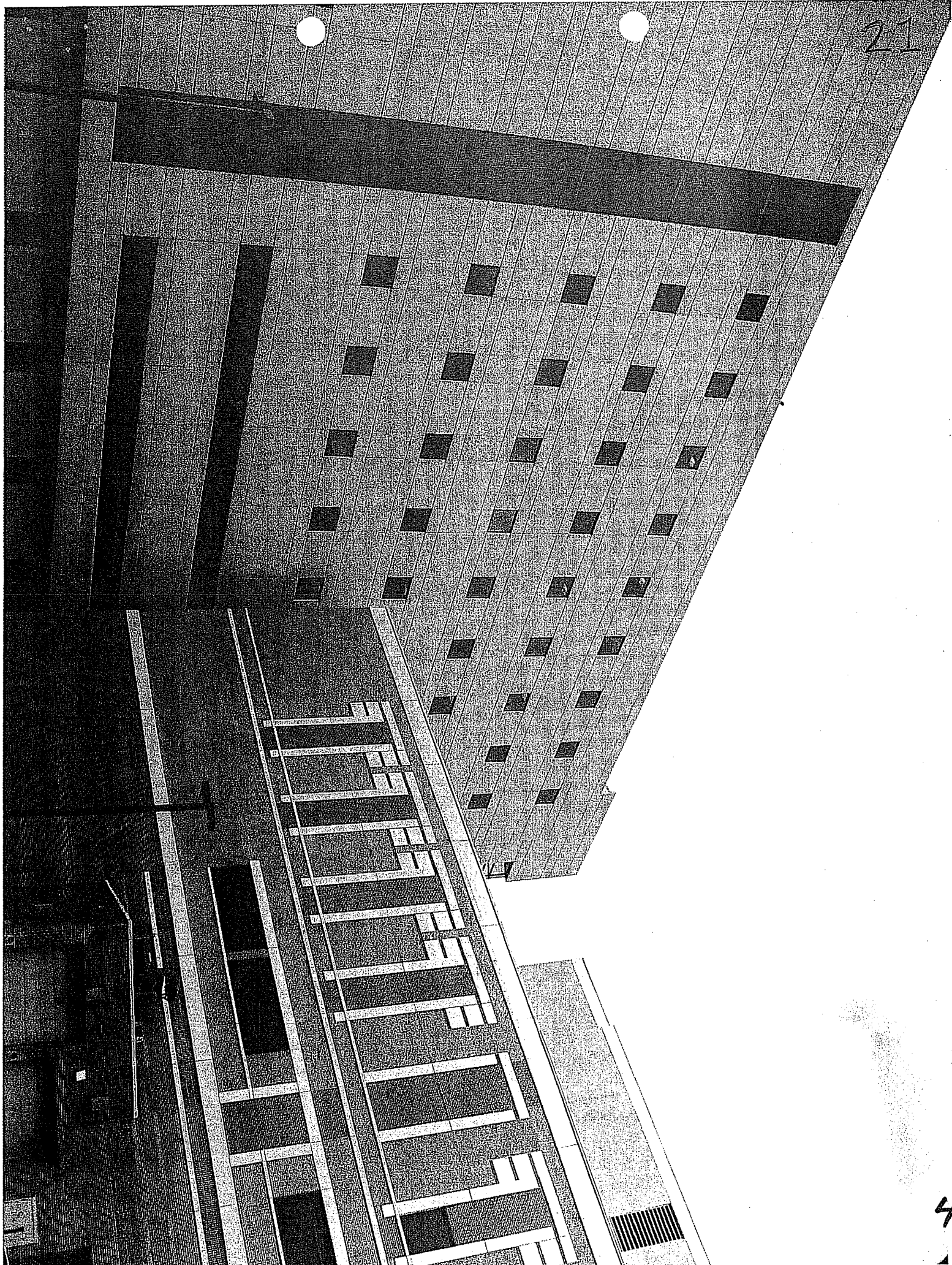
Examples of Existing Surrounding
Building Heights

Picture	Location
18	Monona Terrace Parking Lot - End of Carroll St
19	Monona Terrace Parking Lot - End of Carroll St
20	NW Corner of Doty & Hamilton
21	Sidewalk on Near Side of Wilson
22	NW Corner of Henry & Doty
23	NW Corner of Carroll & Doty

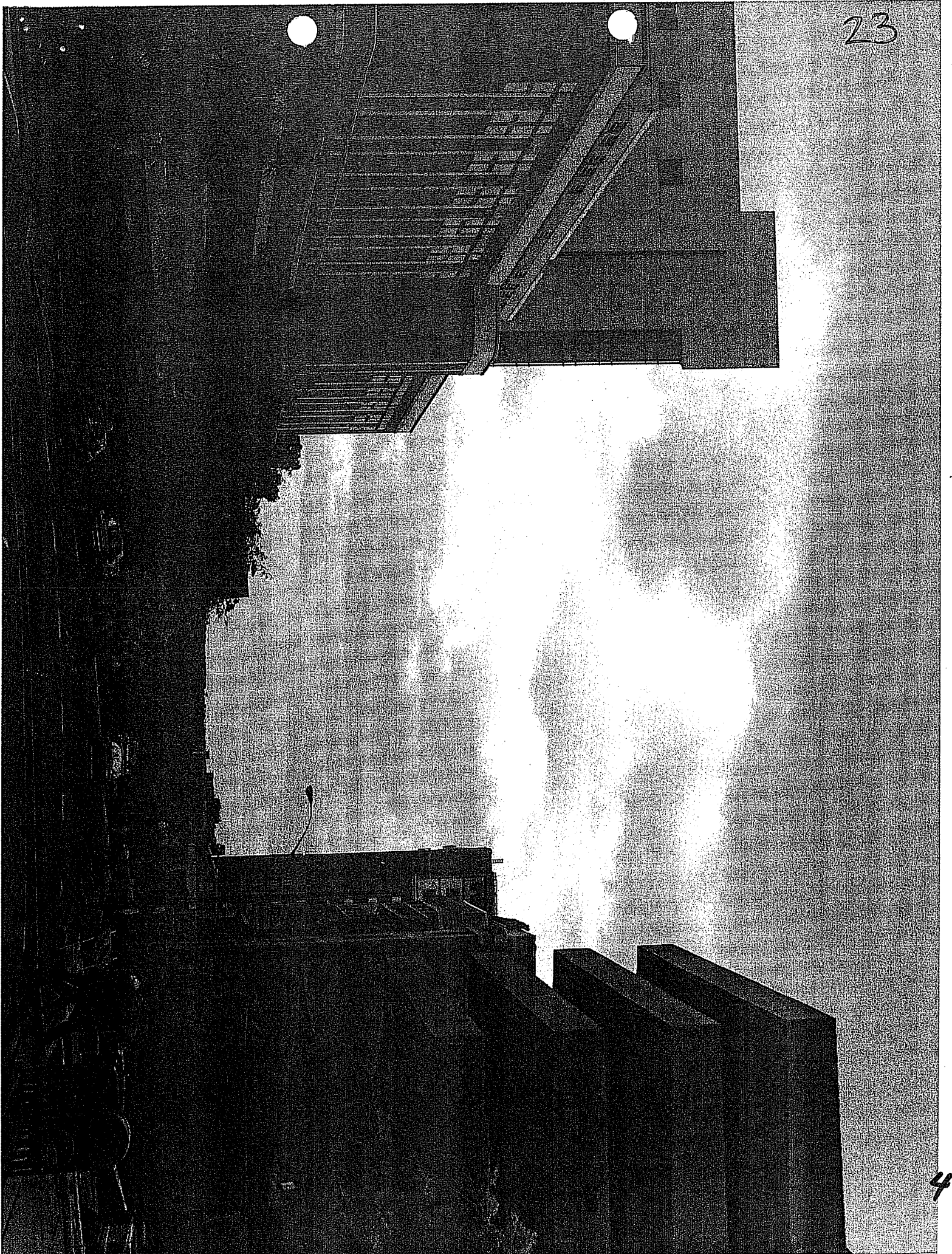












Parks, Timothy

From: Lippert, Keith
Sent: Tuesday, October 30, 2007 10:47 AM
To: Dave Janda; Parks, Timothy
Cc: Welch, John; Murphy, Brad; Tucker, Matthew
Subject: RE: PSB Tower Permit Questions

Tim,

I have worked with Dane County Emergency Management about the concerns and need for the tower in application.

Though we are a City of Madison agency, our shop does all maintenance for and assists in planning for the communications operations in all of Dane County. I have worked with David Janda concerning some of the problems with communications in and out of the Dane County PSB. I have tried to find different alternatives and find that the use of a tower is the only feasible solution to the communication problems they have at their location.

In order for Dane County Emergency Management to adequately address the communication needs of Dane County in an emergency situation, there is a minimum number of radios necessary that must be used. Dane County Sheriffs department also operates out of the same building and uses multiple radio systems from this location as a control headquarters. There are a number of problems that are generated by having multiple antennae on the same horizontal plane. The number of antennae operating on the same frequency band are at a minimum for what is needed for operation. There is no more room available on top of the City County Building and the top of the court house does not provide enough horizontal separation for proper operation of equipment. I also feel that the mounting systems that would be required for general rooftop mounting would be more visually obtrusive than a single tower.

The installation of a tower would fulfill the needs of antenna separation, address the mounting requirements number of needed antennae and I feel would provide the least amount of visual clutter.

If there are any questions that I may be able to answer concerning this location, please feel free to contact me.

Thank you,

Keith Lippert
City of Madison
Communications Operations Supervisor
(608) 266-4767

From: Janda, David [mailto:Janda@co.dane.wi.us]
Sent: Thursday, October 25, 2007 3:23 PM
To: Parks, Timothy
Cc: Welch, John; Murphy, Brad; Tucker, Matthew; Lippert, Keith
Subject: PSB Tower Permit Questions

Tim,

I am working on answering your request for more information on alternatives explored in Dane County Emergency Management's proposal to construct a radio antenna tower on the roof of the Public Safety Building. As I understood it, you were concerned about the aesthetics of the tower and were wondering, could the antennas be placed elsewhere? The documentation in our permit application discussed the feasibility of using remote control

11/20/2007

4



COUNTY OF DANE
Department of Emergency Management

KATHY M. KRUSIEC, Director
(608) 267-1591

Emergency Planning Division
(608) 266-4330

Emergency Medical Services Division
(608) 266-4387

Hazardous Materials Planning Division
(608) 266-9051

September 7, 2007

Michael Verveer
Madison Common Council
210 Martin Luther King Blvd, Room 417
Madison, WI 53703

Alderman Verveer,

Dane County Emergency Management is preparing to submit an application for zoning approval to construct a radio antenna tower on the roof of the Public Safety Building at 115 West Doty Street. I am sending you this notification so that we may have the opportunity to address any issues or concerns of our neighbors before we submit the formal application to the Plan Commission.

The purpose of this project is to enhance critical radio communications into and out of the county's Emergency Operations Center (EOC). The Emergency Operations Center is contained within a hardened, physically secure area on the second floor of the Public Safety Building and serves to support the command and control functions of local and county government in the response to a major emergency or disaster. The EOC is essentially a headquarters where elected officials, agency heads, department representatives, and others with policy-making authority can meet to commit and coordinate resources needed for the response and recovery. As such, effective and reliable communications with incident commanders and emergency managers in the field are absolutely essential to minimizing the impacts of the disaster.

We are proposing to place a 50-foot, guy wired tower on the roof of the elevator penthouse of the building. A tower on the roof of the building is needed for four reasons:

1. *To reduce interference problems between existing radios.* Since the EOC is in a hardened area within the building, each radio used there must be connected to a rooftop antenna in order to receive and transmit a clear signal. Presently, these antennas are all mounted on a railing along the perimeter of the roof of the elevator penthouse. All of the existing antennas are mounted at essentially the same height, creating some serious interference problems. Interference arises when the transmitted signal from one radio overloads the receiver on an adjacent radio because the antennas are too close together. This condition inhibits the ability of the receiving radio to pick up a signal on its intended channel. The solution to this situation is to place the antennas at different elevations so the signal from one antenna cannot interfere with those near it. For reasonable performance, on the VHF frequencies used by county public safety agencies, it is recommended that there be at least 2 meters (6.56 feet) of 'vertical separation' between antennas. Tower mounting would be the best way to achieve this separation.
2. *To increase the number of radios available in the EOC.* There currently are three VHF public safety band antennas and two amateur radio band VHF antennas mounted on the roof of the building. There are also a number of smaller, directional antennas linked to the City of Madison's radio system. These are all located within a very small space, and even without

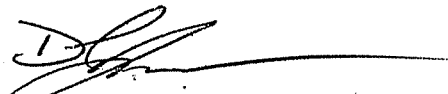
the interference problems, the space would be crowded. After-action reviews of past incidents have indicated the need for additional radio communications in the EOC, recommending the capacity for at least two more radios in the county's VHF public safety band. Dane County's Amateur Radio Emergency Service has also requested space for five additional amateur radio antennas to support their operations. There simply is no space for these additional antennas without going up, especially if we also seek to minimize interference.

3. *To support the installation of a cellular telephone amplification system for the EOC.* The EOC is notorious for poor cellular telephone signal strength. Most agency representatives in the EOC have cell phones and rely on them heavily. Cell phones in the EOC, however, work poorly, if at all. After-action reviews of past exercises and actual incidents consistently recommend that a signal strength amplifier be installed. A cellular signal strength amplification system would require two outdoor antennas, separated vertically by at least 20 feet to work effectively. Again, tower mounting of the antennas is needed to achieve the recommended separation.
4. *To improve radio signal coverage.* Several taller nearby buildings, most notably, the new courthouse, block the radio signal path from the Public Safety Building to substantial portions of the county. While these buildings do not obstruct radio communications completely, they do reduce the signal. Placing the antennas higher up on a tower would greatly increase the range and coverage of the EOC radios.

Based on consultations with personnel in the City's Communications Operations division (aka the radio shop), we believe that with a 50-foot tower and careful arrangement of antennas, the present and future radio communication needs in the EOC can be addressed. Every attempt will be made to keep this installation as visually unobtrusive as possible. The proposed tower is a guy wired, metal lattice tower, with a relatively small footprint (it is a triangle measuring 1'-2 1/2" by 1'-2 1/2" by 1'-4 3/4"). It will be coated with a neutral metal finish. The proposed elevation is below the Capitol View Preservation height and does not require lighting for FAA marking purposes.

The Department is committed to working with our neighbors throughout the zoning permit process, but we are hopeful that if there are any concerns, we can address them early on. Please contact me at your earliest convenience if you have any questions about this proposal. I can be reached at 266-5950.

Sincerely,



David Janda,
Assistant Director

Cc: Ledell Zellers, Capital Neighborhoods
Stephanie LaBella-Luke, State Street Business Association
Kathleen Falk, County Executive
Paul Rusk, Public Protection and Judiciary Committee
Scott McDonell, Dane County Supervisory District 1
Kathy Krusiec, Dane County Emergency Management
John Welch, Dane County Public Works
Joe Norwick, Dane County Public Safety Communications



COUNTY OF DANE
Department of Emergency Management

KATHY M. KRUSIEC, Director
(608) 267-1591

Emergency Planning Division
(608) 266-4330

Emergency Medical Services Division
(608) 266-4387

Hazardous Materials Planning Division
(608) 266-9051

Memorandum

Date: November 5, 2007

To: Tim Parks, Planner
Madison Department of Planning and Development

From: David Janda, Assistant Director

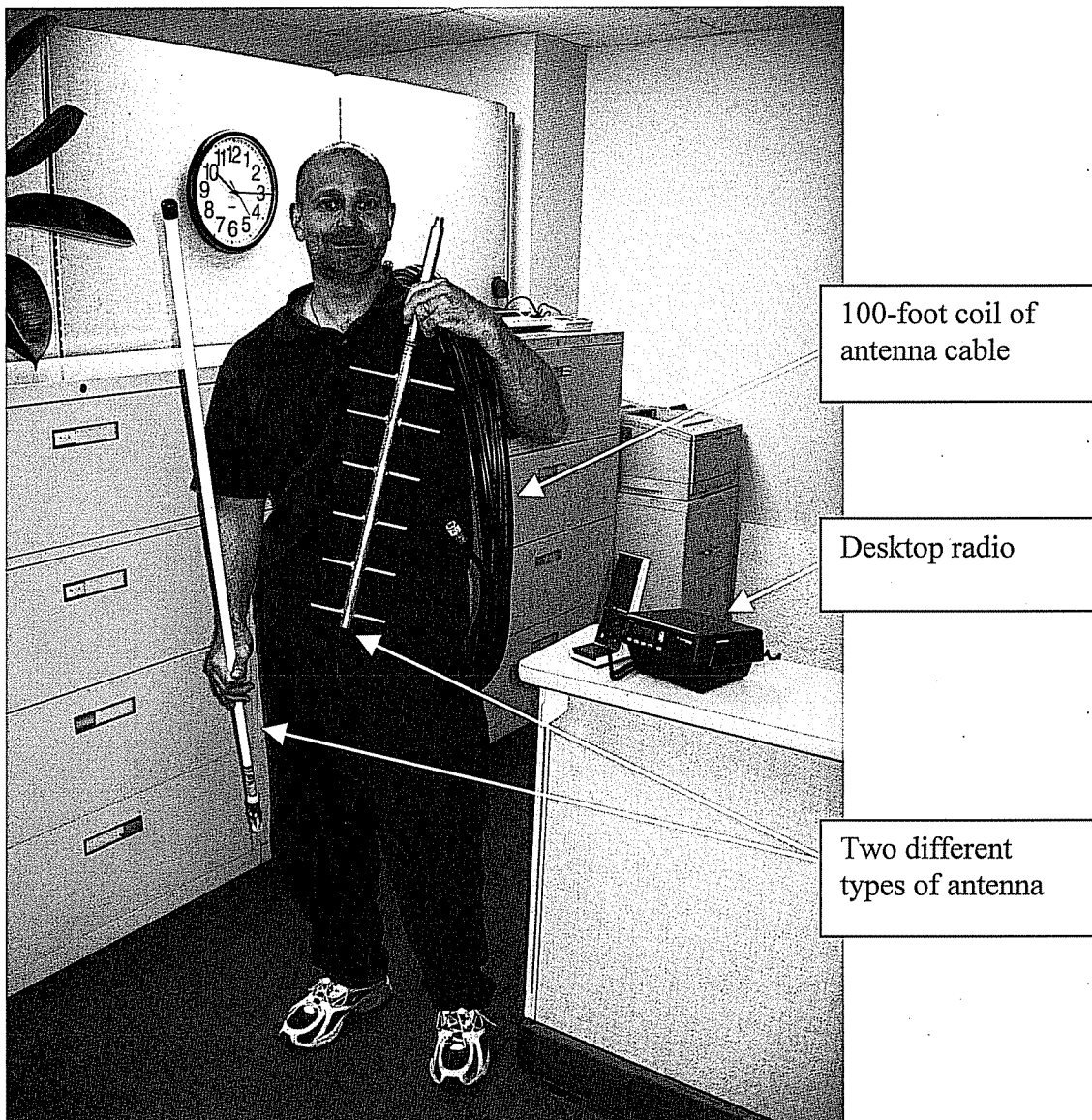
Subject: Alternatives to Proposed Radio Tower

Dane County has submitted a Land Use Application for a project to install a 50-foot radio antenna tower on the roof of the Public Safety Building. The tower is needed to support radio communications in the County's Emergency Operations Center (EOC). The letter of intent attached to the application describes the evaluation of two alternatives; placing the antennas on two or more shorter structures on the PSB roof and using a system of remote controls for radio equipment located in the City-County Building. In consulting with Madison Communications Operations Division (aka Madison radio shop) personnel and EOC user agencies, we have determined that neither of these alternatives is feasible. The reasoning behind this determination is described in the letter of intent.

In the interest of exploring all options for keeping the tower installation as visually unobtrusive as possible, you have asked for the evaluation of one additional alternative; placing the tower and antennas on the roof of the new Courthouse or other nearby building where the structure might be less visible. Dane County Emergency Management shares your concern for the aesthetics of the downtown area. We have proposed a tower structure that we believe will have the least visual impact possible while still providing a coherent solution to a number of serious public-safety radio communications problems. We have also sought during this process to balance our responsibility to the taxpayers to pursue a cost-effective solution with our civic responsibility to be a good neighbor. It is with this balance in mind that I provide you with the following assessment of the alternative of placing our equipment on the roof of the Courthouse:

1. The radio equipment we are discussing is comprised of three components, a desktop radio, a length of antenna cable, and an outside antenna. I have attached a photograph for reference. This arrangement is very similar to the old days when people had outdoor antennas for better television and radio reception. Generally, the higher the antenna, the better the reception. There is one important distinction, however. With radio and television receivers, one antenna can feed more than one receiver – with a splitter on the cable, you could have two or more TVs connected to a single antenna. This is not the

case with the radios used in the EOC. These radios also have a transmitting feature which necessitates that each radio be connected to its own dedicated antenna.



2. Radio signal quality degrades as the length of antenna cabling increases. With very long cable runs, the signal loss can be so great that clear communications become impossible. This is analogous to poor reception in television where a weak signal or poor antenna would result in a snowy image on the screen. When the signal loss is minor, the result is merely a nuisance, but as the signal weakens, at some point, the image becomes so garbled that it is unintelligible. It is the same with voice radio communications, with minor signal loss the transmission sounds weak and crackly, but as the loss increases, communications become less and less intelligible. In public safety communications, weak or unintelligible communications are not acceptable.

The problem of signal loss can be alleviated to some degree by using "low-loss" cabling. Madison Radio Shop personnel, however, advise that in this case, the length of cabling needed to run from the second floor of the PSB to the roof of the Courthouse is simply too long. Even with low-loss cabling, the signal loss would be too great for this design to work.

3. An alternative to the long antenna cable run would be to use a remote control design, with remote control consoles located in the EOC and the actual radio equipment located on or near the roof of the Courthouse. The consoles in the EOC would be connected to the radios via twisted pair wiring and since the radios would be located near the roof, the cable run to the antenna could be relatively short. Twisted pair cables are similar to telephone lines and are not subject to the same signal loss problems as antenna cabling. This design is technically feasible, however it is subject to the same deficiencies described in our letter of intent. These include:
 - a. *Complexity.* Radio remote control configurations are technically complicated and would add numerous subsystems into the design, each increasing the potential for failure. A desktop radio with a rooftop antenna is a simple system and would be much less prone to failure or other technical problems.
 - b. *Lack of redundancy.* If there would be a problem with equipment or other physical operations in the Courthouse, radio communications in the EOC would also be disrupted. For mission-critical communications, this is an unacceptable risk.
 - c. *Cost.* This remote control option is the highest cost of all the alternatives we evaluated. There is an added cost for remote control consoles and special, remote control capable radios. Another added expense would be the significant cost to run the twisted pair cabling between the EOC and Courthouse roof as it is not currently in place.

4. Even with the remote control design, there is still a need for an outdoor antenna dedicated to each radio. This raises the issue of where to actually place the antennas so as to avoid the radio to radio interference described in our letter of intent. In the VHF frequency band, the antennas must be separated by at least 40 feet horizontally or 6.5 feet vertically in order to reduce the potential for interference to an acceptable level. Given the size and configuration of the Courthouse roof, there still would be a need to place the antennas on a tower structure in order to achieve the needed separation. Due to the number of antennas needed, as with the Public Safety Building roof, there would be two options; locate the antennas on one 50-foot tower, or on two 25-foot towers separated from one another by 40 feet or more. Issues with towers on the roof of the Courthouse include:
 - a. Improved radio coverage due to the additional height compared to the PSB. If feasible, this would actually provide a benefit.
 - b. A 50-foot tower could be located near the center of the building, possibly making it less visible from the street.
 - c. A 50-foot tower would be subject to FAA marking requirements, meaning that it would be painted and lighted in order to make it more visible to passing aircraft.
 - d. A 50-foot tower would exceed the City's Capitol View Preservation height restriction by more than 49 feet.

- e. Two 25-foot towers would need to be located near the edge of the building to achieve the necessary 40-foot separation between them. A 25-foot structure on the Courthouse roof would not be high enough to necessitate FAA marking and lighting requirements. However, since the towers would be near the roof edge, both would likely be more visible from street level. A 25-foot tower would also exceed the Capitol View Preservation height restriction by more than 24 feet.
- f. The cost to install two 25-foot towers would be more than twice the cost to install one 50-foot tower. Please see the permit application letter of intent for an explanation.

Conclusion

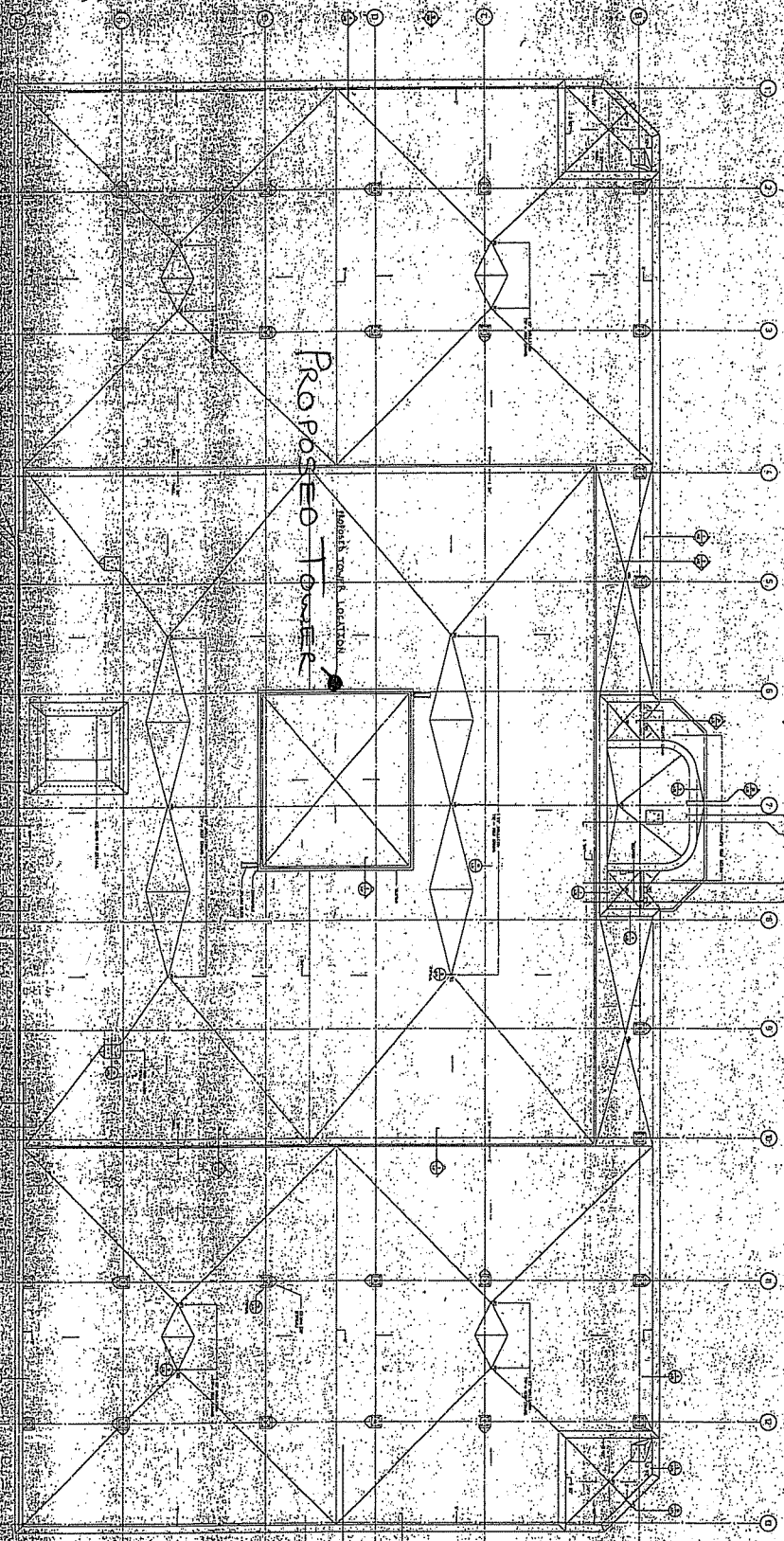
The alternative of placing the antenna equipment on the roof of the Courthouse, or any other downtown building is not feasible and may actually work at cross purposes with the objective of keeping the structure as visually unobtrusive as possible. While the Courthouse roof is higher than the Public Safety Building and there would be a radio coverage advantage to locating the EOC radio equipment there, significant technical and cost barriers prevent this from being a viable option. In addition, while there may be an advantage in reduced visibility of the tower when observed from nearby, a tower located on the roof of the Courthouse would actually be much more visible from a distance than would the PSB location. Increased visibility from a distance, in combination with necessarily exceeding the Capitol View Preservation height and the possibility of tower lighting and marking (if the 50-foot option were to be selected) make the Courthouse site an unlikely prospect. A tower on the Courthouse roof would simply be more visible to more people and would create more of a detrimental impact on the downtown character than would a tower on the roof of the Public Safety Building.

We do not take this project lightly and certainly understand concerns regarding the aesthetic impact of our proposal. Our evaluation of alternatives has been thorough, and given our situation, I believe we have proposed the best solution possible, aesthetically, technically, and financially.

We have met with the neighborhood association, addressed their concerns and have received their endorsement. We have also met with the Urban Design Commission (UDC) and received their final approval. Although the UDC's endorsement was not enthusiastic from an aesthetic perspective, I believe they understood the need for the project and the limited options available. The UDC also recommended that if or when the Public Safety Building is expanded, radio antenna location should be included as a building design element. We will heed that recommendation to the best of our ability and this tower will be a temporary solution until that time.

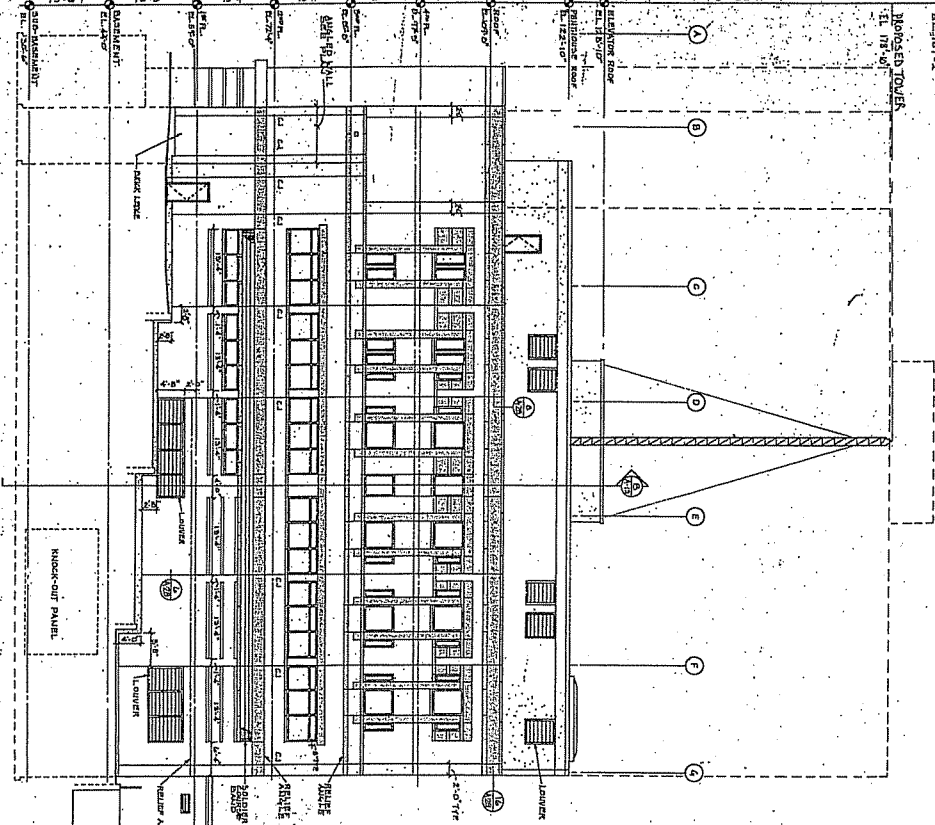
Thank you for your consideration. Please contact me at 266-5950 if you have any additional questions or concerns.

Cc: Kathleen Falk, County Executive
Kathy Krusiec, Dane County Emergency Management
John Welch, Dane County Public Works

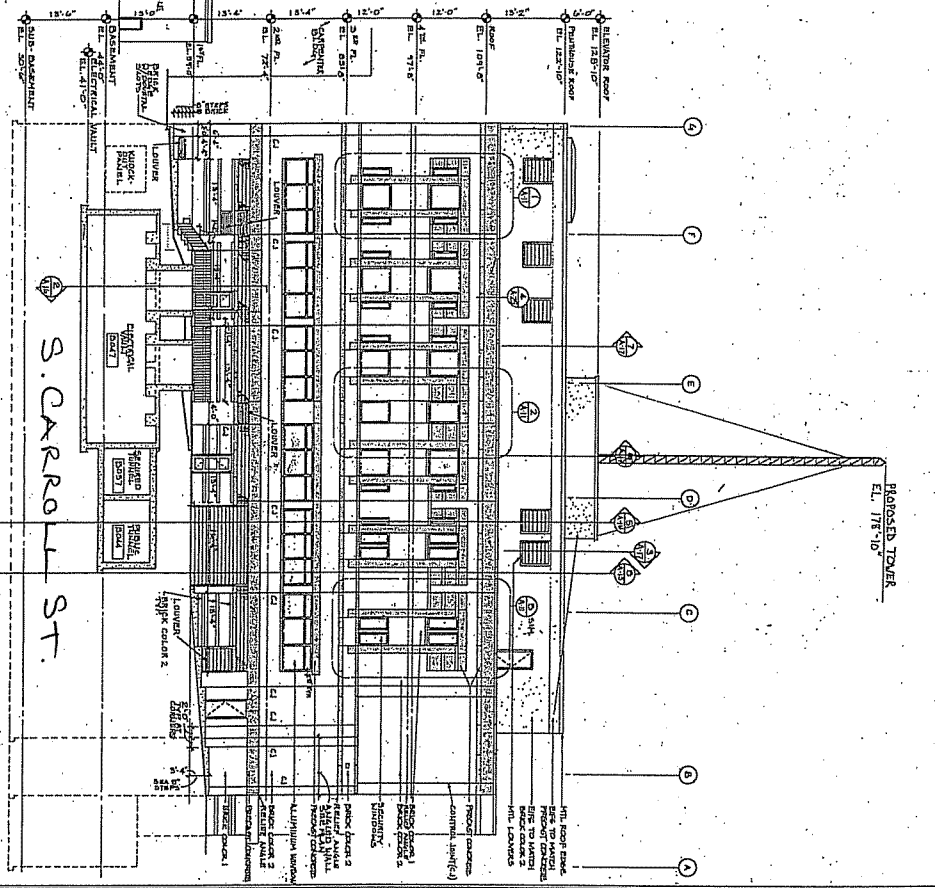


W DOTY STREET

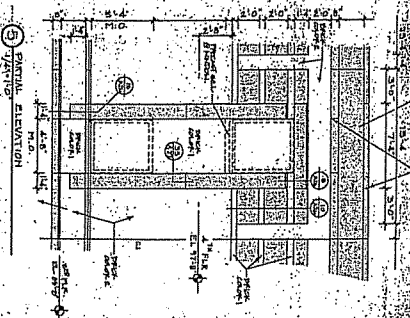
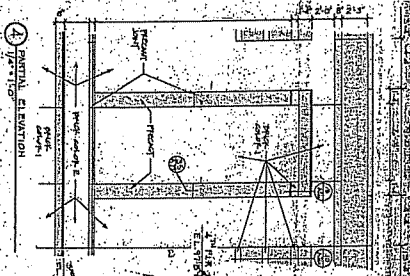
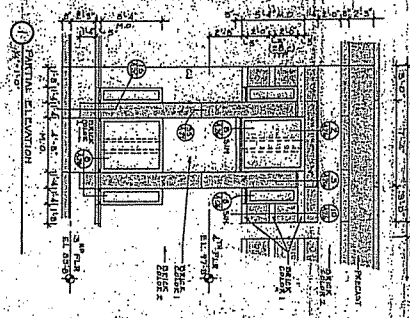
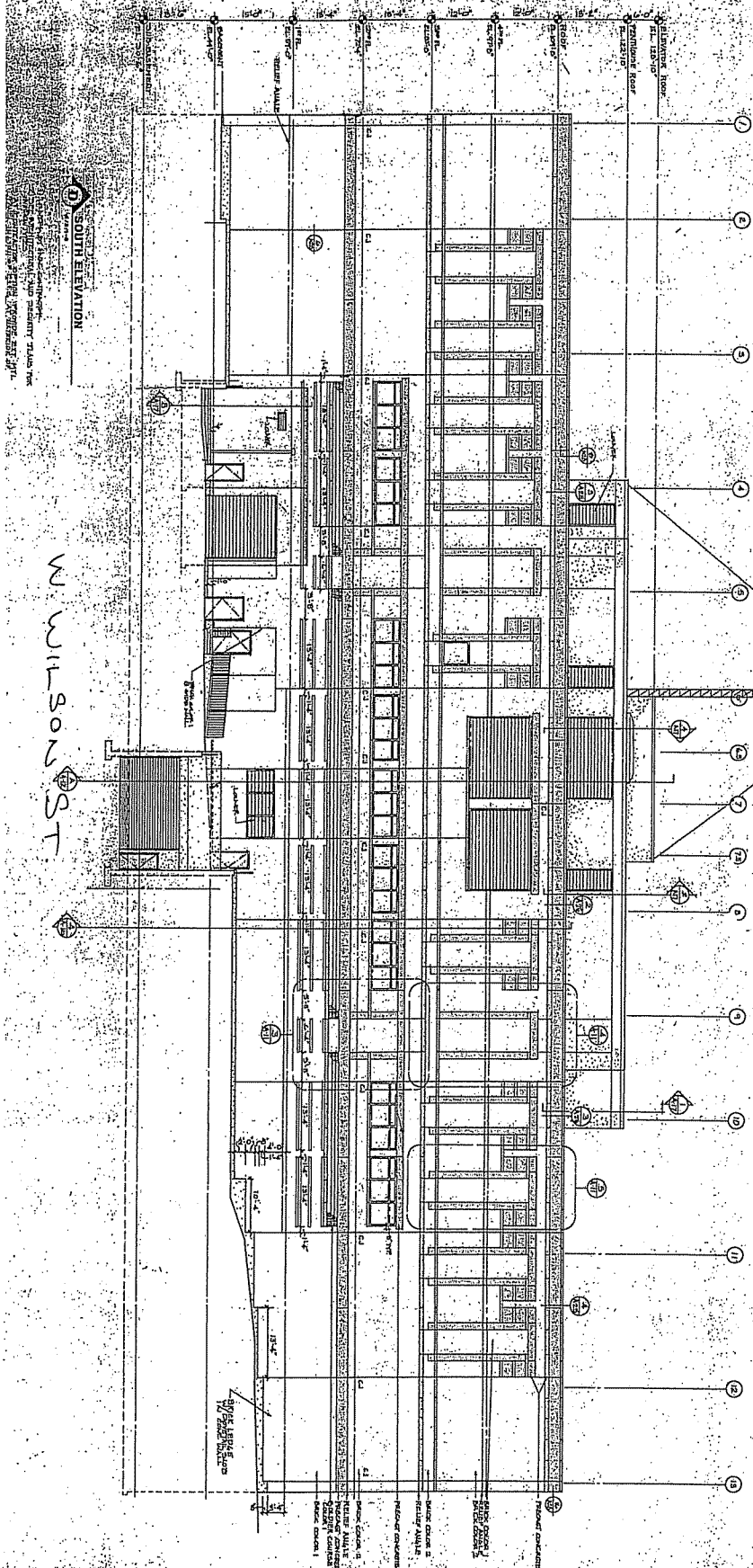
S CARROLL ST



B WEST ELEVATION



C EAST ELEVATION



PROPOSED TOWER
EL. 118'-10"

10 SOUTH ELEVATION

W WILSON ST

Author	Architect
Checked by	Engineer
Drawn by	Surveyor
Field notes	Vertical alignment
Other notes	Stationing

Durroni Architects
 1001 N. ...
 Chicago, IL ...

IDAHO COUNTY JAIL

ADDON, WILSON